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Drift Card Observations in Northwestern Washington Along Portions of Two Proposed Oil Pipeline Routes

Evans-Hamilton, Inc.
Seattle, WA

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During 24-30 April 1978 and 1-2 July 1980, a total of 5257 drift cards were released along portions of two pipelines proposed to carry crude oil across Washington State. The thin floatable plastic cards, having a specific gravity close to most crude oils, drift predominantly under the influence of local currents and winds until beached. Their reported recovery assists in determining possible trajectories and shoreline impact areas of potential surface and near surface oil spills. 273 or 39% of the 700 cards released between 24-30 April 1978 and 2023 or 44% of the 4557 cards released on 1-2 July 1980 were recovered and reported by the public before 30 September 1980.

Of the cards released near Port Angeles, approx. ½ of those recovered were found on Dungeness Spit; another ¼ were found within the remaining inner Strait of Juan de Fuca. About ½ and ¼ of the cards found from releases in the vicinity of Protection Island were recovered in the inner and outer Strait of Juan de Fuca, respectively. Recoveries of drift cards released across the mouth of Admiralty Inlet were more widely dispersed than releases from the other areas, with the San Juan Islands and Victoria being heavily impacted. Two-thirds of the cards recovered from releases within Admiralty Inlet were recovered within Admiralty Inlet itself; the majority of those recovered elsewhere were found in the San Juan Islands and Victoria. 93% of the recoveries of cards released in Saratoga Passage were recovered in Whidbey Basin; similarly 99% of the cards recovered from releases in Skagit Bay were found in Whidbey Basin. (contd. on back)

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by

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ABSTRACT

During 24-30 April 1978 and 1-2 July 1980, a total of 5257 drift cards were released along portions of two pipelines proposed to carry crude oil across the State of Washington. The cards, which are thin floatable plastic having a specific gravity close to most crude oils, drift predominantly under the influence of local currents and winds until beached. Their reported recovery assists in determining possible trajectories and shoreline impact areas of potential surface and near surface oil spills. Two hundred seventy-three or 39% of the 700 cards released between 24-30 April 1978 and 2023 or 44% of the 4557 cards released on 1-2 July 1980 were recovered and reported by the public before 30 September 1980.

Of the cards released near Port Angeles, approximately one-half of those recovered were found on Dungeness Spit; another one-quarter were found within the remaining inner Strait of Juan de Fuca. About one-half and one-quarter of the cards found from releases in the vicinity of Protection Island were recovered in the inner and outer Strait of Juan de Fuca, respectively. Recoveries of drift cards released across the mouth of Admiralty Inlet were more widely dispersed than releases from the other areas, with the San Juan Islands and Victoria being heavily impacted. Two-thirds of the cards recovered from releases within Admiralty Inlet were recovered within Admiralty Inlet itself; the majority of those recovered elsewhere were found in the San Juan Islands and Victoria. Ninety-three percent of the recoveries of cards released in Saratoga Passage were recovered in Whidbey Basin; similarly 99% of the cards recovered from releases in Skagit Bay were found in Whidbey Basin.

In general a low percentage of those cards recovered were found on the Pacific Coast strongly suggesting that should oil be discharged into marine surface waters along the proposed crude oil pipeline routes the bulk of it which goes aground will beach on inland shores rather than on the coast of the Pacific Ocean.

1. INTRODUCTION

Interest in the inland marine waters of northwestern Washington and Canada (Fig. 1.1) has recently intensified because of proposals to ship large quantities of crude oil to an offloading facility on the Washington side of the Strait of Juan de Fuca. Two such plans as developed by the Northern Tier Pipeline Company and the Trans-Mountain Oil Pipeline Corporation call for offloading facilities at Port Angeles and Low Point, respectively (U.S. Department of the Interior, Bureau of Land Management, 1979). From these locations the oil would be pumped by pipeline to the midwestern United States. In northwestern Washington, the proposed pipelines would traverse both over land and under inland waters (Fig. 1.1).

Due to both the expected increase in oil tanker traffic on the inland waters and the proposed underwater portions of the pipelines, there is considerable public concern toward an increased risk of accidental discharges of petroleum into the marine environment and the possible environmental damage resulting from such discharges. As a result studies have been conducted to determine the fate of spilled oil.

Several methods have been used to describe the possible movement of oil discharged into surface marine waters of Washington. These include trajectories based upon: 1) numerical models (Stewart, 1978; Pease et al., 1979); 2) an hydraulic tidal model (Ebbesmeyer et al., 1979); and 3) the movement of several types of surface drifters (Ebbesmeyer et al., 1977, 1978; Cox et al., 1978; Pashinski and Charnell, 1979). Of these methods drift cards provide a long range and inexpensive approach to obtain possible gross trajectories of floatable oil. The cards are thin, floatable polypropylene plastic having a specific gravity of 0.9 which is near that of most crude oils (0.84-0.98; Pashinski and Charnell, 1979).

Previous studies (Ebbesmeyer et al., 1978; Pashinski and Charnell, 1979) reported drift card recoveries from release positions within Puget Sound and the Strait of Juan de Fuca; however, few releases were made along the proposed oil pipeline routes. To investigate the possible movement of oil released into surface waters from the proposed pipelines 5257 drift cards were released along their routes. Herein is described the recoveries of 2296 of these cards along with selected historical observations of currents and concurrent observations of winds.

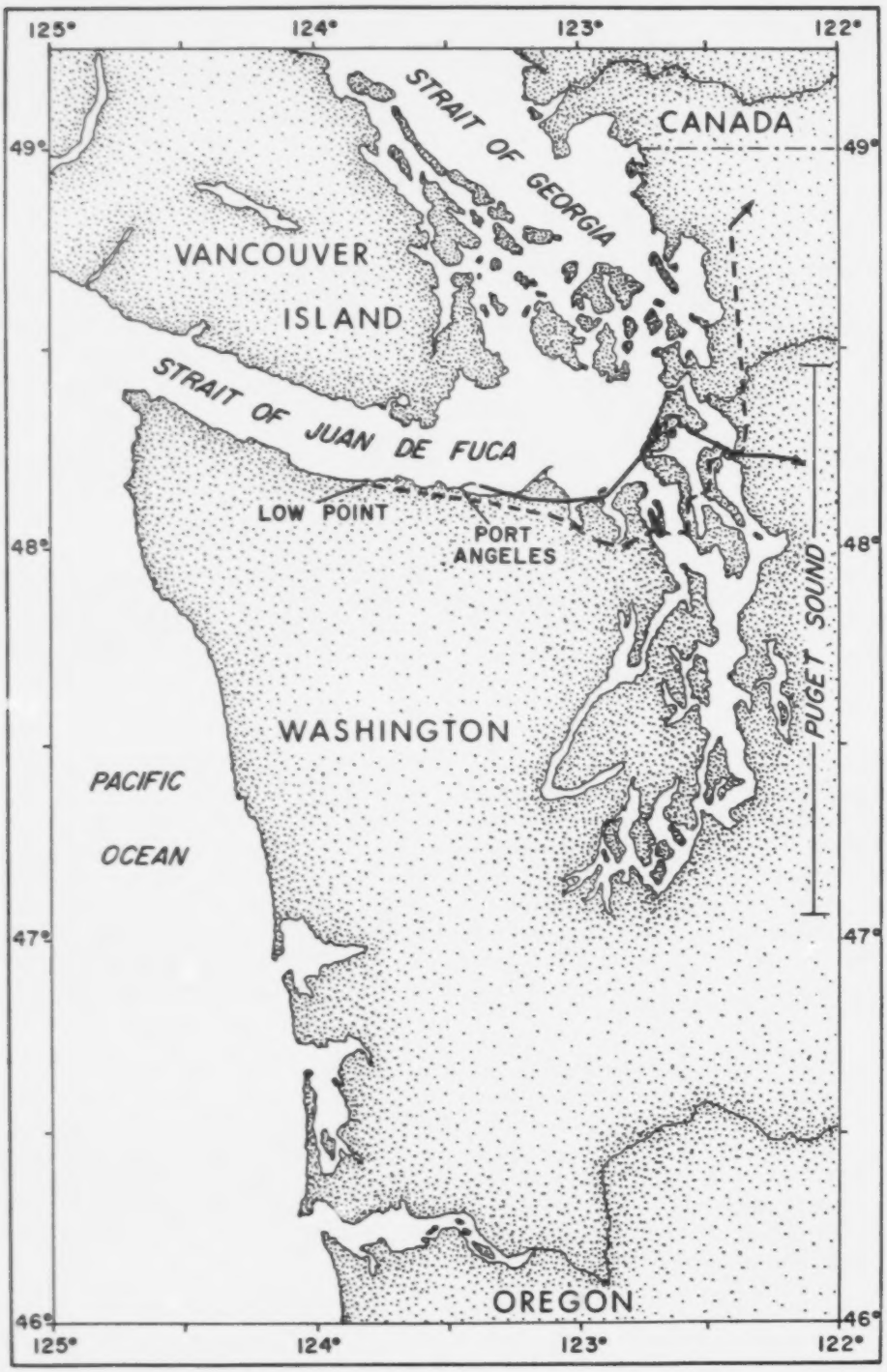

Figure 1.1. Inland marine waters of northwestern Washington and Canada. The tentative routes of oil pipelines proposed by the Northern Tier Pipeline Company and the Trans-Mountain Oil Pipeline Corporation are shown by solid and dashed lines, respectively.

2. PROJECT DESCRIPTION

Three data sets were collected and analyzed: 1) recoveries of drift cards; 2) historical observations of near surface currents within selected portions of Puget Sound, the Strait of Juan de Fuca, San Juan Islands, and the Strait of Georgia; and 3) winds observed at selected stations in northwestern Washington and Canada.

2.1 DRIFT CARDS

During 1978 and 1980, 5257 drift cards were released along underwater portions of the proposed oil pipelines (Fig. 2.1). During 24-30 April 1978 700 drift cards were released at seven locations (grouped here into sites A, and B; see Ebbesmeyer et al., 1978 for specific release positions) in the vicinity of Port Angeles. The cards were deployed from a small boat in batches of 100; three deployments were made during flood tides and four during ebb tides. Release positions were determined by sextant.

On 1 and 2 July 1980 a total of 4557 drift cards were released at the beginning of a major flood (1 July) and major ebb (2 July) at 22 and 24 sites, respectively (Fig. 2.1). One hundred cards were released at each site during each tidal phase with the exception of sites 23 and 24 where 100 cards were launched during a major ebb only. Deployment of the cards was accomplished using a Cessna model 172 aircraft flying at approximately 35 m above the water. The cards were dropped at preselected locations where the actual positions of the release sites were determined using a combination of magnetic compass headings, timed flights, and visual observations. All cards were deployed in 1-2 hours during each tidal phase.

After release the cards drift predominately under the influence of local currents and winds. Each card (Fig. 2.2) is colored international orange to attract a finder and is marked with a unique number and raised letter message requesting the finder to report the card number, date, and position of the card's recovery to the National Oceanic and Atmospheric Administration (NOAA) in Seattle, Washington. Each individual who responded was sent a letter stating the date, time, and position of the card's release and overall intent of the project.

Recoveries of drift cards released in 1978 were tabulated by NOAA's Pacific Marine Environmental Laboratory (PMEL) Puget Sound Drift Program who then provided this data to the authors. This data was originally described by Ebbesmeyer et al. (1978) and later summarized by Ebbesmeyer et al. (1979). Herein the recoveries made subsequent to those reports are added and the complete data set analyzed.

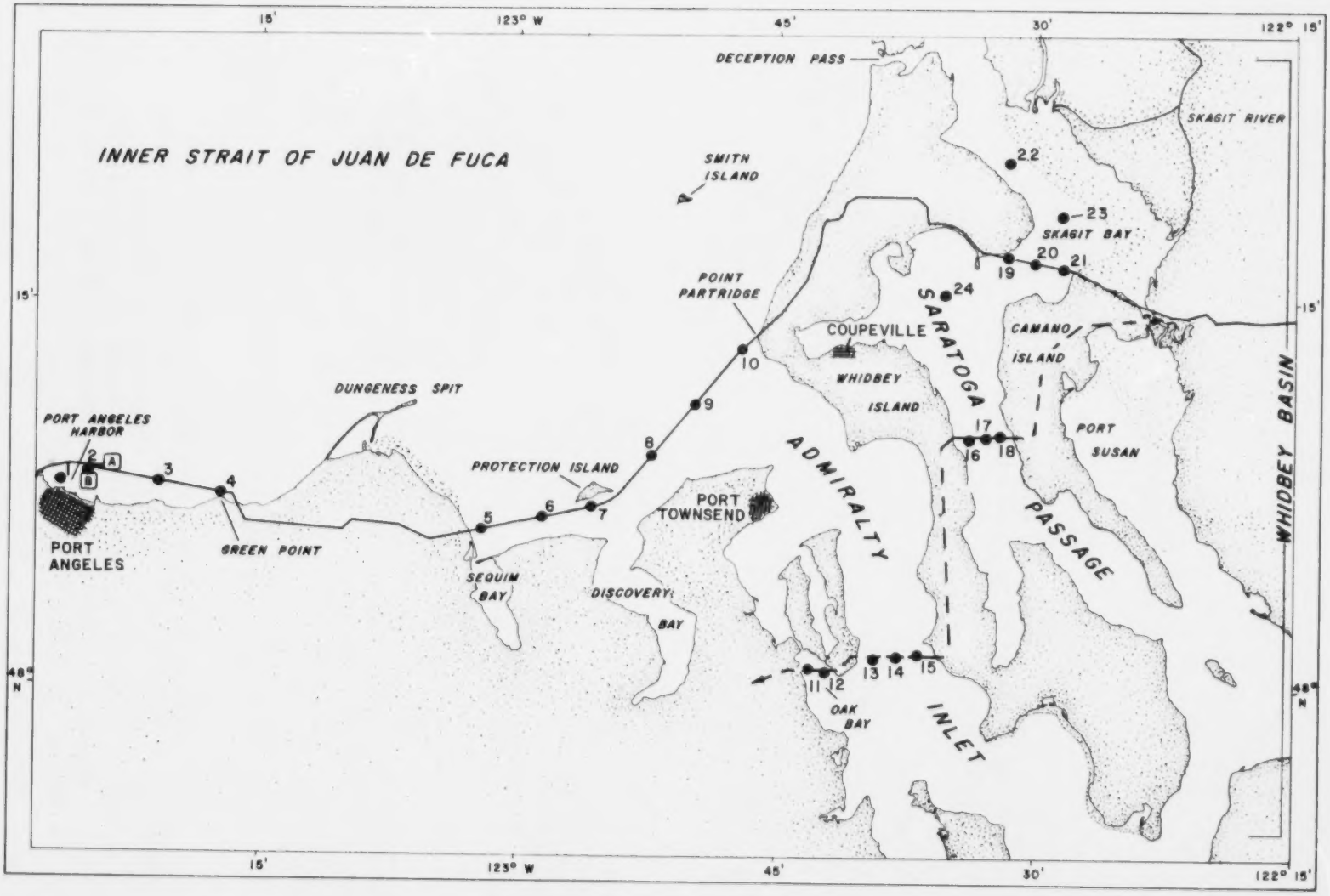

Figure 2.1. Sites of drift card releases during 24-30 April 1978 (sites A-B) and 1-2 July (sites 1-24) along the proposed Northern Tier (solid line) and Trans-Mountain (dashed line) oil pipeline routes

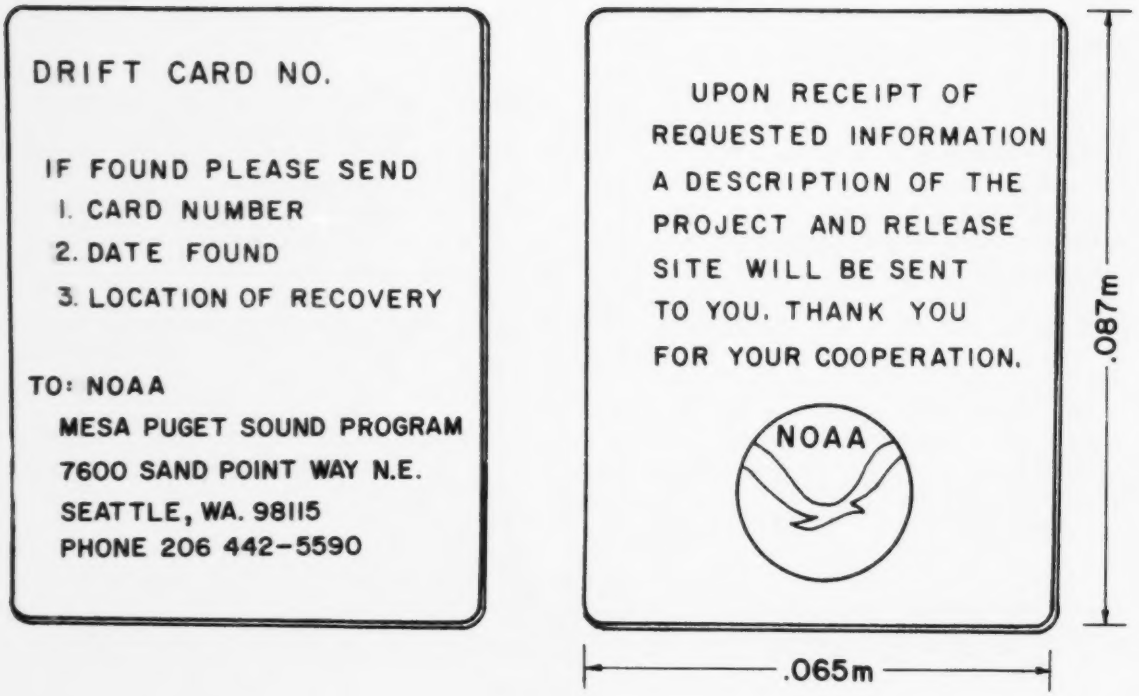

Figure 2.2. Illustrations of the two sides of a drift card. Each card is approximately 0.0024 m thick, colored international orange, and stamped with a unique number.

Reports of the recoveries of drift cards released in 1980 were received by NOAA's Marine Ecosystems Analysis (MESA) Puget Sound Program Office. The positions of all drift card recoveries reported by the public to the NOAA/MESA office as of 30 September 1980 were plotted on appropriate nautical charts. The date, time, latitude, and longitude of each recovery were then recorded.

Both the 1978 and 1980 data sets were digitized to allow computer plotting of the drift card recoveries. Maps of the recovery positions of each 100 drift cards released are shown in Appendix A. Tabulations of the date, time, and position of release and recovery of each drift card recovered are given in Appendix B.

Drift card recoveries are biased by several factors. First, in order to be recovered the cards must be transported into areas that are accessible. Second, the public must use these areas to a sufficient degree that the drift cards are found. Most drift cards are found on beaches where daily and seasonal use may vary a great deal (e.g., weekday versus weekend and winter versus summer usage). Pashinski and Charnell (1979) studied 1470 recoveries of the 5000 drift cards they released within Puget Sound and the Strait of Juan de Fuca and found that the public recovered approximately the same percentage of cards in all seasons with weekend recoveries predominating only in spring and summer. Third, the amount of time cards lie on the shore before recovery is unknown. Finally, some recoveries may not be reported. In an experiment conducted in New York in 1974, Long Island beaches were seeded with 1000 drift cards during both winter and summer to determine what percentage of the cards the public would recover within three days and report. During winter the public found and reported 47% of the cards released, while in summer 59% were reported (Hardy et al., 1976).

In our experiment it must be emphasized that a lack of recoveries in any area does not necessarily indicate that drift cards did not reach these areas, only that none were reported by 30 September 1980 as being recovered there.

2.2 NET CURRENTS

Selected net currents near the water surface (0-6 m depth) were determined from a combination of published and original historical records. A summary of the data sources and net currents is given in Appendix C.

2.3 WINDS

Winds observed at 19 weather stations during 1 July-31 August 1980 were obtained from the National Weather Service. The stations were selected to approximately cover the area of most drift card recoveries. Maps of weekly mean winds are shown in Appendix D and daily mean winds are listed in Appendix E.

For the 1978 drift card releases, wind observations previously have been presented by Ebbesmeyer et al. (1978).

3. DRIFT CARD RECOVERIES

In 1978 700 drift cards were released of which 273 (39%) were recovered and reported by the public to NOAA/PMEL by 30 September 1980. Of 4557 drift cards released in 1980, 2023 (44%) were reported by NOAA/MESA by the same date. Thus a total of 2296 (44%) of the drift cards released during the two years were reported.

In order to characterize general tendencies of the data and for ease in presentation, drift card release and recovery sites were grouped. Release sites were grouped into 6 specific areas of interest: vicinity of Port Angeles, vicinity of Protection Island, across the mouth of Admiralty Inlet, in Admiralty Inlet, in Saratoga Passage, and in Skagit Bay. Recovery sites were grouped into nine general geographic areas and are shown in Figure 3.1. Following is a discussion of recoveries in the nine geographical areas of drift cards released in the six areas of specific interest.

3.1 RELEASES IN THE VICINITY OF PORT ANGELES (SITES A-B AND 1-4)

Drift cards were released at six sites from the head of Port Angeles Harbor to Green Point (Fig. 2.1). Sites A-B (1978) and 1-2 (1980) were close to the mouth of, or within Port Angeles Harbor. Sites 3-4 (1980) lie along the pipeline route between the Harbor and Green Point.

In 1978 and 1980 a similar number of cards were released near Port Angeles (700 versus 790); a total of 273 (39%) and 348 (44%) of the cards released were recovered, respectively. Figure 3.2 shows the recovery locations of cards released in the vicinity of Port Angeles during 24-30 April 1978. Figure 3.3 shows the recovery locations of cards released in the same area during 1-2 July 1980 (see Appendix A for 1978 and 1980 individual release and recovery maps). Table 3.1 lists the number (in parenthesis) and percentage of recoveries within the nine geographical areas shown in Figure 3.1.

There are similarities in the recoveries for 1978 and 1980. Approximately half of the drift cards recovered from each year's releases were found on Dungeness Spit (1978, 53%; 1980, 63%). The percentage of recoveries found within the entire inner Strait of Juan de Fuca, including Dungeness Spit and Victoria, are also similar (1978, 86%; 1980, 78%). In both years 1-2% of the cards were found in Admiralty Inlet.

The major differences between the two years were the percentage of cards found seaward of Port Angeles, northward in the San Juan Islands,

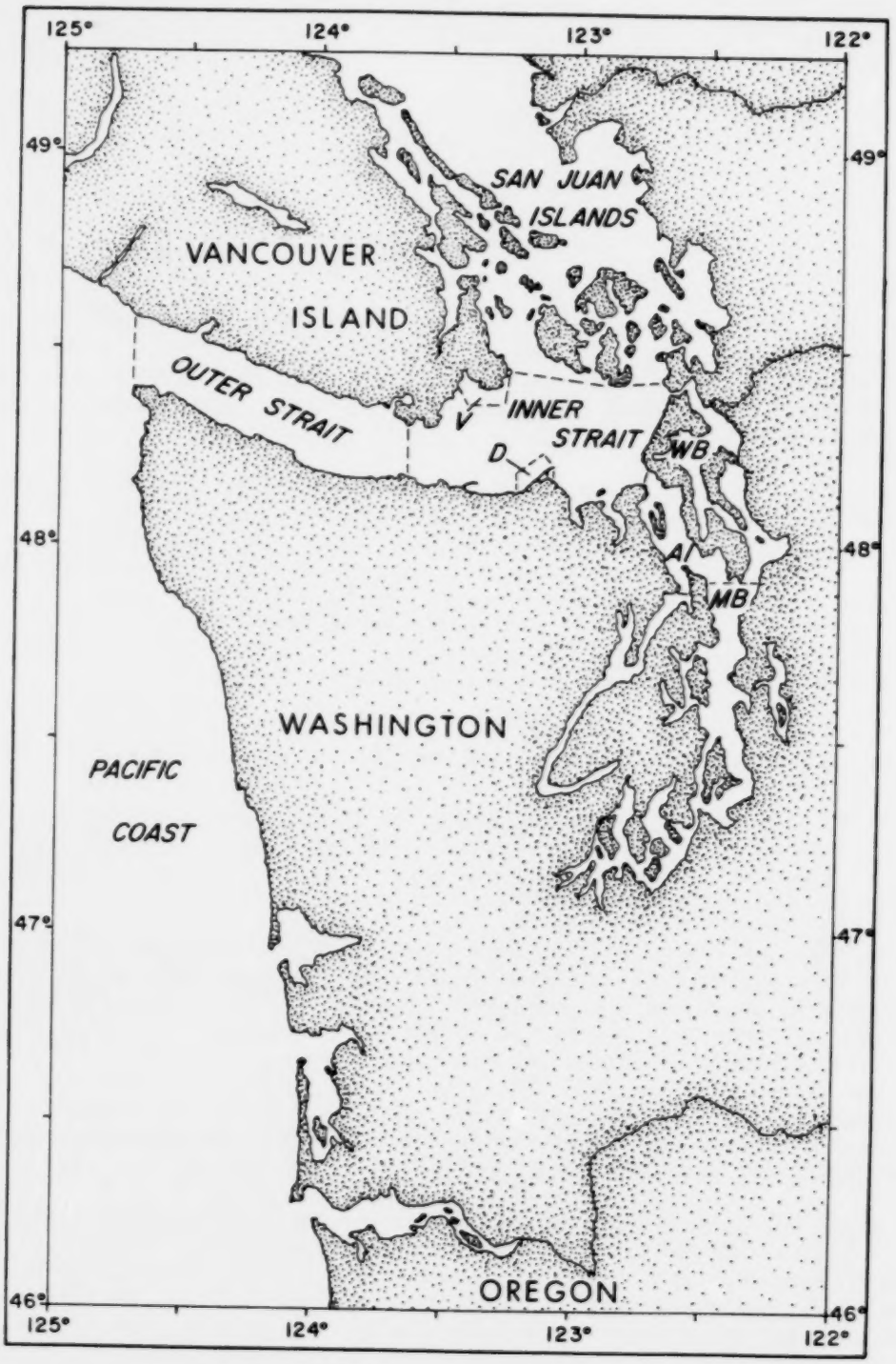

Figure 3.1. Areas by which drift card recoveries were grouped. Notation: V, Victoria; D, Dungeness Spit; WB, Whidbey Basin, AI, Admiralty Inlet; and MB, Main Basin.

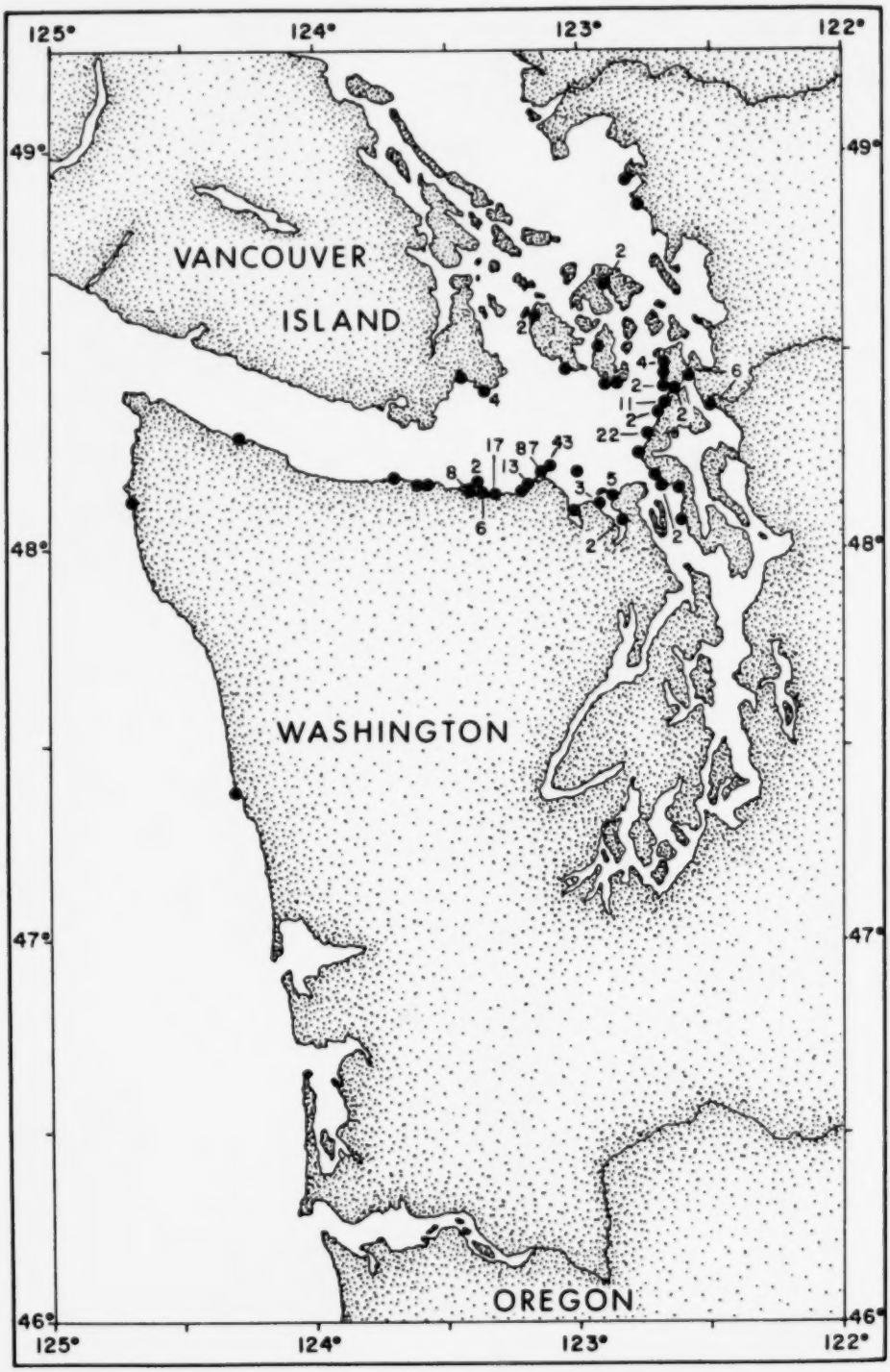

Figure 3.2. Recovery positions of drift cards released in the vicinity of Port Angeles in 1978 (sites A-B; see Fig. 2.1). The cards were released during 24-30 April. Notation: unnumbered dots, single recoveries; and numbered dots, multiple recoveries with the number signifying the number of cards recovered. One recovery is off the map at 48° 58.8'N, 125° 37.0'W on the Pacific Coast of Vancouver Island.

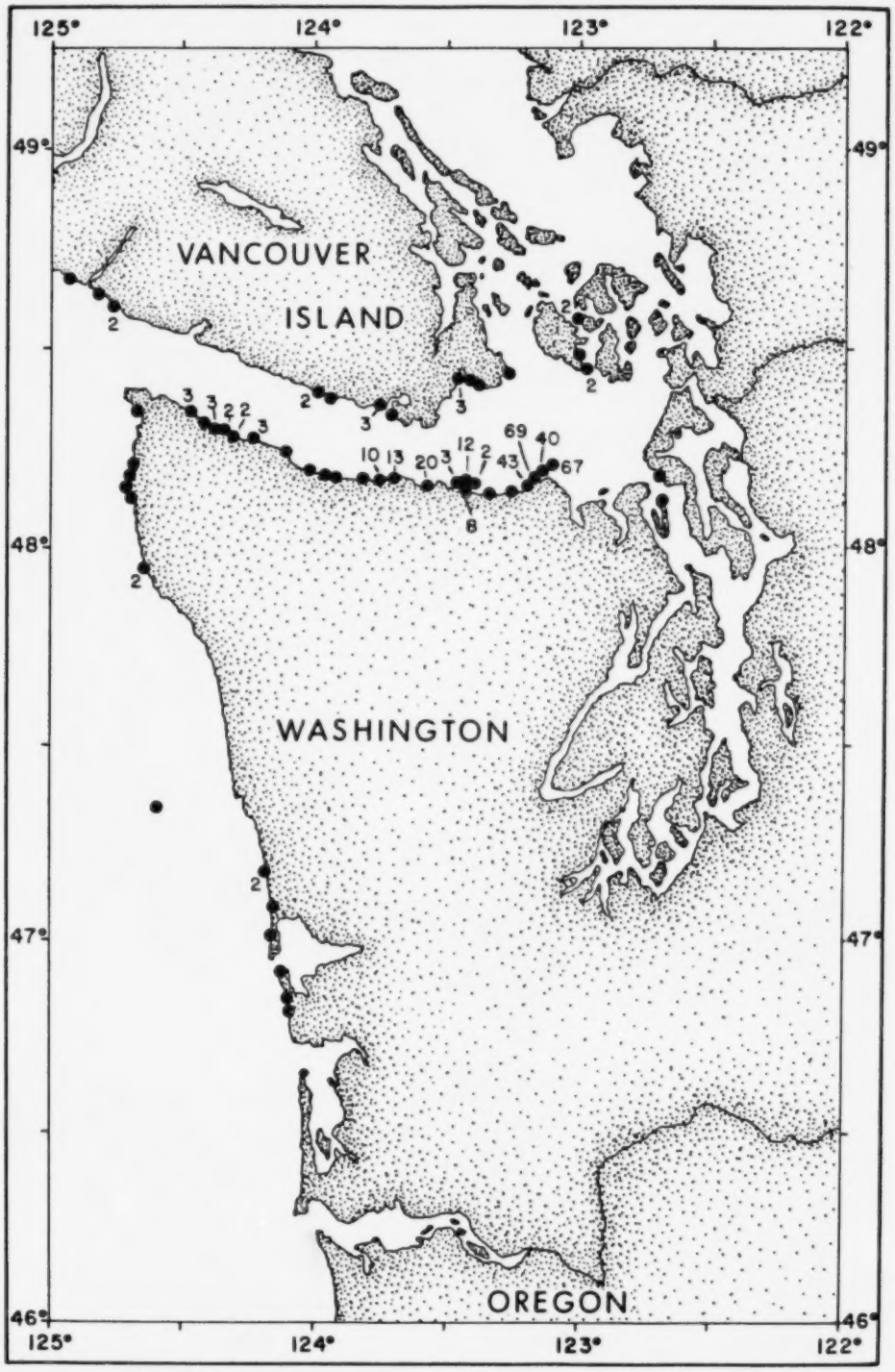

Figure 3.3. Recovery positions of drift cards released in the vicinity of Port Angeles in 1980 (sites 1-4; see Fig. 2.1). The cards were released during 1-2 July. Notation: unnumbered dots, single recoveries; and numbered dots, multiple recoveries with the number signifying the number of cards recovered. One recovery is off the map at 45° 28.0'N, 123° 53.0'W on the Pacific Coast of Oregon.

TABLE 3.1. RECOVERIES OF DRIFT CARDS RELEASED IN THE VICINITY OF PORT ANGELES (SITES A-B, 1-4)

Site No.	First Card No.	# Released	# Recovered	PERCENT OF RECOVERIES BY AREAS: Whidbey Basin	Main Basin	Admiralty Inlet	Dungeness Spit	Victoria	Remaining Inner Strait	San Juan Islands	Outer Strait	Pacific Coast	Total % Recovered
1978													
a) Flood													
A	9001	100	37	16%(6)	0	3%(1)	10%(4)	0	46%(17)	19%(7)	3%(1)	3%(1)	37%
A	9301	100	73	0	0	0	93%(68)	0	7%(5)	0	0	0	73%
B	9101	100	23	26%(6)	0	4%(1)	13%(3)	0	48%(11)	9%(2)	0	0	23%
Total		300	133	9%(12)	0	2%(2)	56%(75)	0	25%(33)	7%(9)	0.5%(1)	0.5%(1)	44%
b) Ebb													
A	9501	100	34	0	0	0	59%(20)	3%(1)	29%(10)	3%(1)	3%(1)	3%(1)	34%
A	9601	100	38	0	0	0	71%(27)	3%(1)	23%(9)	0	0	3%(1)	38%
B	9201	100	37	3%(1)	0	8%(3)	8%(3)	8%(3)	62%(23)	11%(4)	0	0	37%
B	9401	100	31	0	0	0	62%(19)	0	32%(10)	3%(1)	0	3%(1)	31%
Total		400	140	1%(1)	0	2%(3)	49%(69)	4%(5)	37%(52)	4%(6)	1%(2)	2%(3)	35%
c) Total: Flood + Ebb		700	273	5%(13)	0	2%(5)	53%(144)	2%(5)	31%(85)	5%(15)	1%(3)	1%(4)	39%
1980													
a) Flood													
1	10300	96	39	0	0	0	36%(14)	3%(1)	15%(6)	5%(2)	33%(13)	8%(3)	41%
2	10200	99	39	0	0	3%(1)	25%(10)	5%(2)	23%(9)	3%(1)	41%(16)	0	39%
3	10100	96	84	0	0	0	100%(84)	0	0	0	0	0	88%
4	10000	100	64	0	0	0	100%(64)	0	0	0	0	0	64%
Total		391	226	0	0	1%(1)	76%(172)	1%(3)	7%(15)	1%(3)	13%(29)	1%(3)	58%
b) Ebb													
1	12300	99	37	0	0	0	60%(22)	0	22%(8)	5%(2)	5%(2)	8%(3)	37%
2	12200	100	20	0	0	5%(1)	0	0	50%(10)	0	20%(4)	25%(5)	20%
3	12100	100	35	0	0	0	49%(17)	9%(3)	11%(4)	0	20%(7)	11%(4)	35%
4	12000	100	30	0	0	0	30%(9)	0	30%(9)	0	23%(7)	17%(5)	30%
Total		399	122	0	0	1%(1)	39%(48)	2%(3)	26%(31)	2%(2)	16%(20)	14%(17)	31%
c) Total: Flood + Ebb		790	348	0	0	1%(2)	63%(220)	2%(6)	13%(46)	1%(5)	14%(49)	6%(20)	44%

TABLE 3.1 (continued)

Site No.	First Card No.	# Released	# Recovered	PERCENT OF RECOVERIES BY AREAS: Whidbey Basin	Main Basin	Admiralty Inlet	Dungeness Spit	Victoria	Remaining Inner Strait	San Juan Islands	Outer Strait	Pacific Coast	Total % Recovered
1978 + 1980													
a) Flood		691	359	3%(12)	0	1%(3)	69%(247)	1%(3)	14%(48)	3%(12)	8%(30)	1%(4)	52%
b) Ebb		799	262	0%(1)	0	1%(4)	45%(117)	3%(8)	32%(83)	3%(8)	8%(22)	8%(20)	33%
c) Total:	Flood + Ebb	1490	621	2%(13)	0	1%(7)	59%(364)	2%(11)	21%(131)	3%(20)	8%(52)	4%(24)	42%

and eastward in Whidbey Basin. In 1978 2% of the cards recovered were found seaward of Port Angeles, whereas in 1980 20% were found in this area. Ten percent of the cards found from the 1978 releases were recovered in Whidbey Basin and the San Juan Islands whereas 1% of the 1980 recoveries were found in these areas.

The two data sets differ further in that for 1980 releases the number of drift cards recovered in certain areas may depend upon the tidal phases at the time of release. Seventy-seven percent of the recoveries of cards released on flood tides in 1980 were found on Dungeness Spit in contrast to 39% from ebb releases. Only 1% of the recoveries from flood releases were found on the Pacific Coast; 14% of the recoveries from ebb releases were found in this area. Differences of this type were not found in the 1978 data.

3.2 RELEASES IN THE VICINITY OF PROTECTION ISLAND (SITES 5-7)

At sites 5, 6, and 7 from Protection Island westward to the mainland (Fig. 2.1) 583 drift cards were released in 1980. Of 197 recoveries 59% were found in the inner Strait of Juan de Fuca (where 36% were found on Dungeness Spit, 2% at Victoria, and 21% at other points on the perimeter of the Inner Strait); 25% were found in the outer Strait of Juan de Fuca, 11% were found on the Pacific Coast, 3% were found in the San Juan Islands, and 2% were found in Admiralty Inlet (Fig. 3.4; Table 3.2). Recovery patterns from releases made during flood and ebb tides appear similar.

3.3 RELEASES ACROSS THE MOUTH OF ADMIRALTY INLET (SITES 8-10)

Sites 8-10 lie across the mouth of Admiralty Inlet from northeast of Protection Island to Point Partridge. Of 589 cards released at these sites 216 (37%) were recovered (Fig. 3.5; Table 3.3). Eighty-three percent of the cards recovered were found in four areas: 13% in Admiralty Inlet, 15% in the San Juan Islands, 23% near Victoria, and 32% along the southern shore of the Strait of Juan de Fuca westward from the tip of Dungeness Spit. Five percent were found on the Pacific Coast.

Major differences in flood and ebb releases are clearly evident for recoveries in Admiralty Inlet and on Dungeness Spit. Most of the recoveries in Admiralty Inlet occurred for releases made on flood tide. For Dungeness Spit 25% of all cards found came from releases on an ebb tide, 6% from a flood tide.

Recovery patterns varied with release site. Of those cards reaching Dungeness Spit, two-thirds were released at site 8 on an ebb tide. For those reaching the San Juan Islands 84% came from site 10.

3.4 RELEASES IN ADMIRALTY INLET (SITES 11-15)

Sites 11 and 12 lie within Oak Bay and sites 13-15 traverse Admiralty Inlet (Fig. 2.1). Of 999 cards released 440 were recovered, two-thirds of

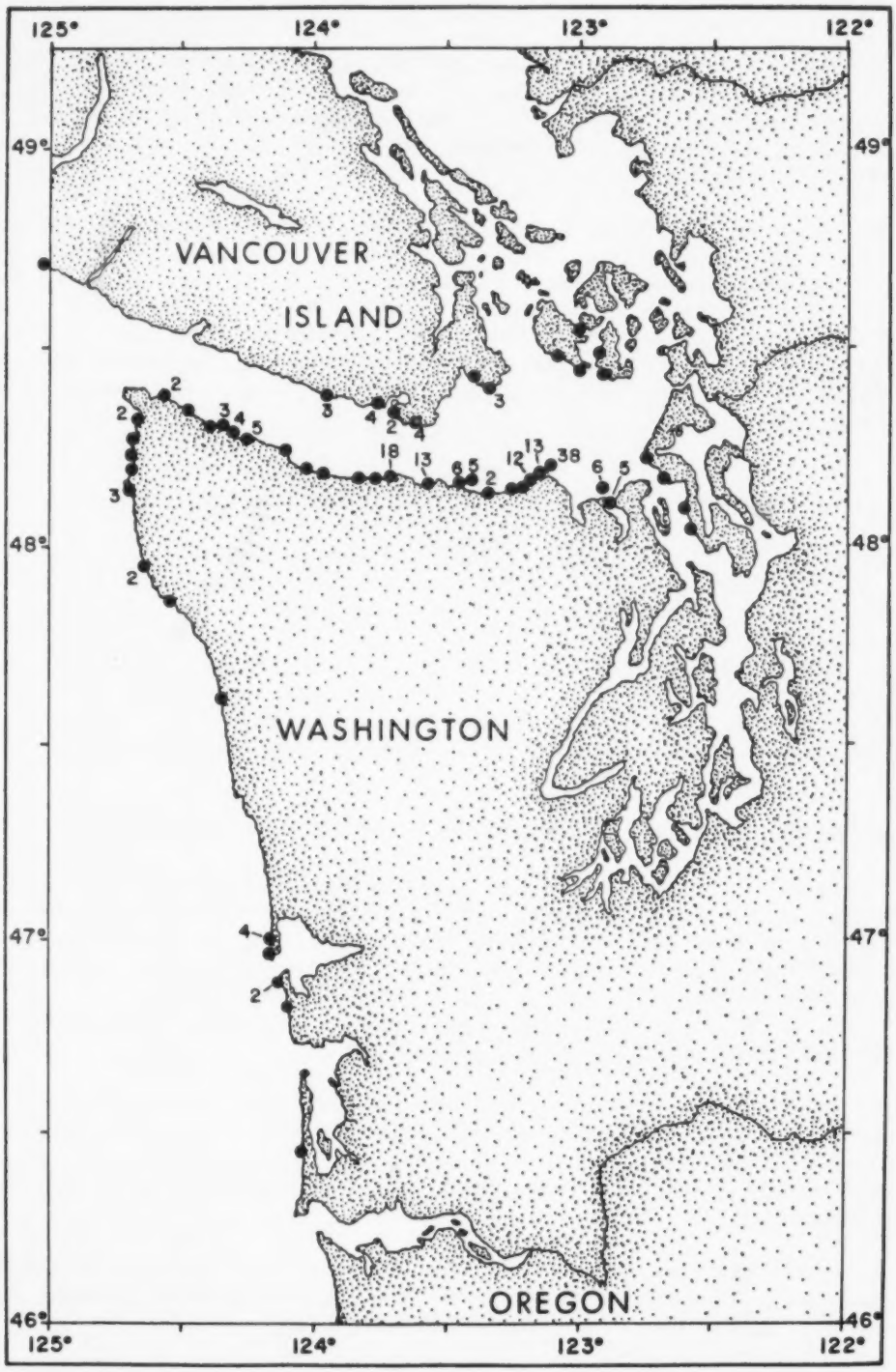

Figure 3.4. Recovery positions of drift cards released in the vicinity of Protection Island (sites 5-7; see Fig. 2.1). The cards were released during 1-2 July 1980. Notation: unnumbered dots, single recoveries; numbered dots, multiple recoveries with the number signifying the number of cards recovered.

TABLE 3.2. RECOVERIES OF DRIFT CARDS RELEASED IN THE VICINITY OF PROTECTION ISLAND (SITES 5-7).

Site No.	First Card No.	# Released	# Recovered	PERCENT OF RECOVERIES BY AREAS									Total % Recovered
				Whidbey Basin	Main Basin	Admiralty Inlet	Dungeness Spit	Victoria	Remaining Inner Strait	San Juan Islands	Outer Strait	Pacific Coast	
a) Flood													
5	10400	94	40	0	0	0	43%(17)	0	30%(12)	5%(2)	12%(5)	10%(4)	42%
6	10500	96	29	0	0	0	31%(9)	3%(1)	25%(7)	3%(1)	31%(9)	7%(2)	30%
7	10600	95	36	0	0	8%(3)	31%(11)	3%(1)	8%(3)	3%(1)	39%(14)	8%(3)	38%
Total		285	105	0	0	3%(3)	35%(37)	2%(2)	21%(22)	4%(4)	27%(28)	8%(9)	37%
b) Ebb													
5	12400	99	32	0	0	0	28%(9)	0	31%(10)	0	22%(7)	19%(6)	32%
6	12500	99	25	0	0	0	36%(9)	0	20%(5)	0	24%(6)	20%(5)	25%
7	12600	100	35	0	0	0	45%(16)	6%(2)	14%(5)	6%(2)	23%(8)	6%(2)	35%
Total		298	92	0	0	0	37%(34)	2%(2)	22%(20)	2%(2)	23%(21)	14%(13)	31%
c) Total: Flood + Ebb													
		583	197	0	0	2%(3)	36%(71)	2%(4)	21%(42)	3%(6)	25%(49)	11%(22)	34%

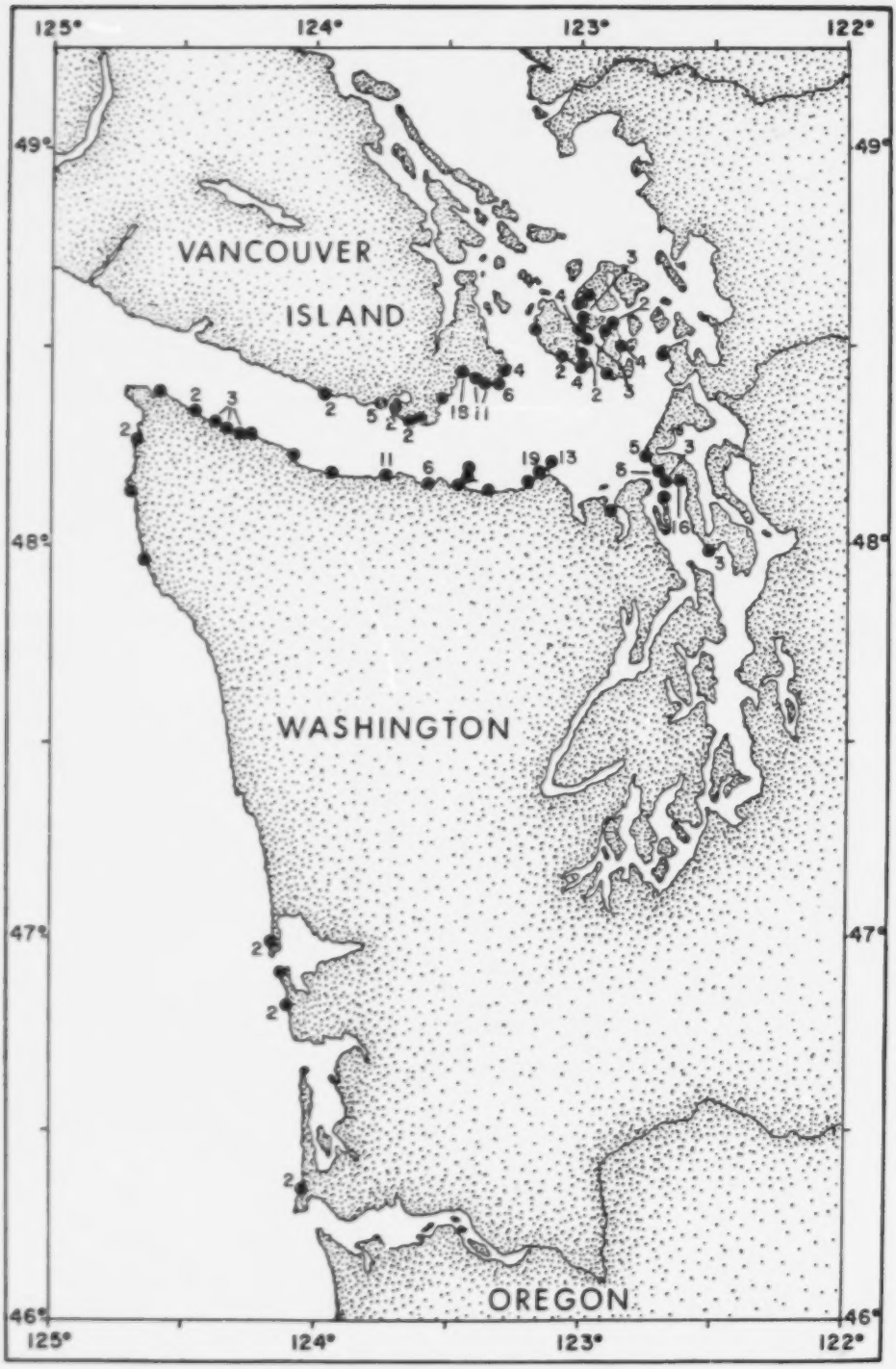

Figure 3.5. Recovery positions of drift cards released across the mouth of Admiralty Inlet (sites 8-10; see Fig. 2.1). The cards were released during 1-2 July 1980. Notation: unnumbered dots, single recoveries; numbered dots, multiple recoveries with the number signifying the number of cards recovered.

TABLE 3.3. RECOVERIES OF DRIFT CARDS RELEASED ACROSS THE MOUTH OF ADMIRALTY INLET (SITES 8-10).

Site No.	First Card No.	# Released	# Recovered	PERCENT OF RECOVERIES BY AREAS: Whidbey Basin	Main Basin	Admiralty Inlet	Dungeness Spit	Victoria	Remaining Inner Strait	San Juan Islands	Outer Strait	Pacific Coast	Total % Recovered
a) Flood													
8	10700	97	35	0	0	17%(6)	11%(4)	35%(12)	11%(4)	9%(3)	11%(4)	6%(2)	36%
9	10800	97	37	0	0	35%(13)	3%(1)	33%(12)	5%(2)	5%(2)	14%(5)	5%(2)	38%
10	10900	95	40	0	0	20%(8)	5%(2)	15%(6)	15%(6)	33%(13)	5%(2)	7%(3)	42%
Total		289	112	0	0	24%(27)	6%(7)	27%(30)	11%(12)	16%(18)	10%(11)	6%(7)	39%
b) Ebb													
8	12700	100	38	0	0	0	61%(23)	5%(2)	5%(2)	0	26%(10)	3%(1)	38%
9	12800	100	28	0	0	0	7%(2)	25%(7)	25%(7)	0	32%(9)	11%(3)	28%
10	12900	100	38	0	0	3%(1)	3%(1)	29%(11)	10%(4)	37%(14)	15%(6)	3%(11)	38%
Total		300	104	0	0	1%(1)	25%(26)	19%(20)	13%(13)	13%(14)	24%(25)	5%(5)	35%
c) Total: Flood + Ebb													
		589	216	0	0	13%(28)	15%(33)	23%(50)	12%(25)	15%(32)	17%(36)	5%(12)	37%

which were found in Admiralty Inlet itself (Fig. 3.6; Table 3.4). Second highest percentage of recoveries were at Victoria (11%) and the San Juan Islands (11%). A few percent were found at Dungeness Spit, the Outer Strait of Juan de Fuca, and the Pacific Coast. Major differences between flood and ebb releases are not apparent.

3.5 RELEASES IN SARATOGA PASSAGE (SITES 16-18)

Sites 16-18 traverse Saratoga Passage within Whidbey Basin. At these sites 596 cards were released of which 200 (34%) were recovered. Ninety-three percent of these were found within Whidbey Basin (Fig. 3.7; Table 3.5). Three percent of those recovered were found in Admiralty Inlet, and 2% were found in Puget Sound's Main Basin. One percent or less were found in each of the following areas: the inner Strait of Juan de Fuca, San Juan Islands, outer Strait of Juan de Fuca, and Pacific Coast.

It is interesting that 31 (16%) of the 200 cards recovered were found in Port Susan, 28 of the cards being found at nearly the same spot. All the cards were released at sites 16 and 17. Second, six cards were recovered in Admiralty Inlet and three were found in the northern reaches of Puget Sound's Main Basin. Third, no cards were reported from those released on flood tide at site 18 as mentioned earlier.

3.6 RELEASES IN SKAGIT BAY (SITES 19-24)

Sites 19-21 lie on the proposed pipeline route across Skagit Bay. Sites 22-23 are located to the north of this crossing, while site 24 lies southwest of it. Of 1000 drift cards released at these sites, 622 (62%) were recovered. Ninety-nine percent of these cards were found in Whidbey Basin. One percent or less were found in both the San Juan Islands (7 cards) and the inner and outer Strait of Juan de Fuca (2 and 1 cards, respectively)

Within Whidbey Basin the beaches on the eastern side of Whidbey Island north of sites 16-18 were most heavily impacted. Several cards were also recovered just east of Deception Pass. In several instances many of the recoveries were found near the same location by the same individual; e.g., of 100 cards released on an ebb tide at site 22 near Deception Pass, 99 were recovered by the same person near the same site (Appendix A.51).

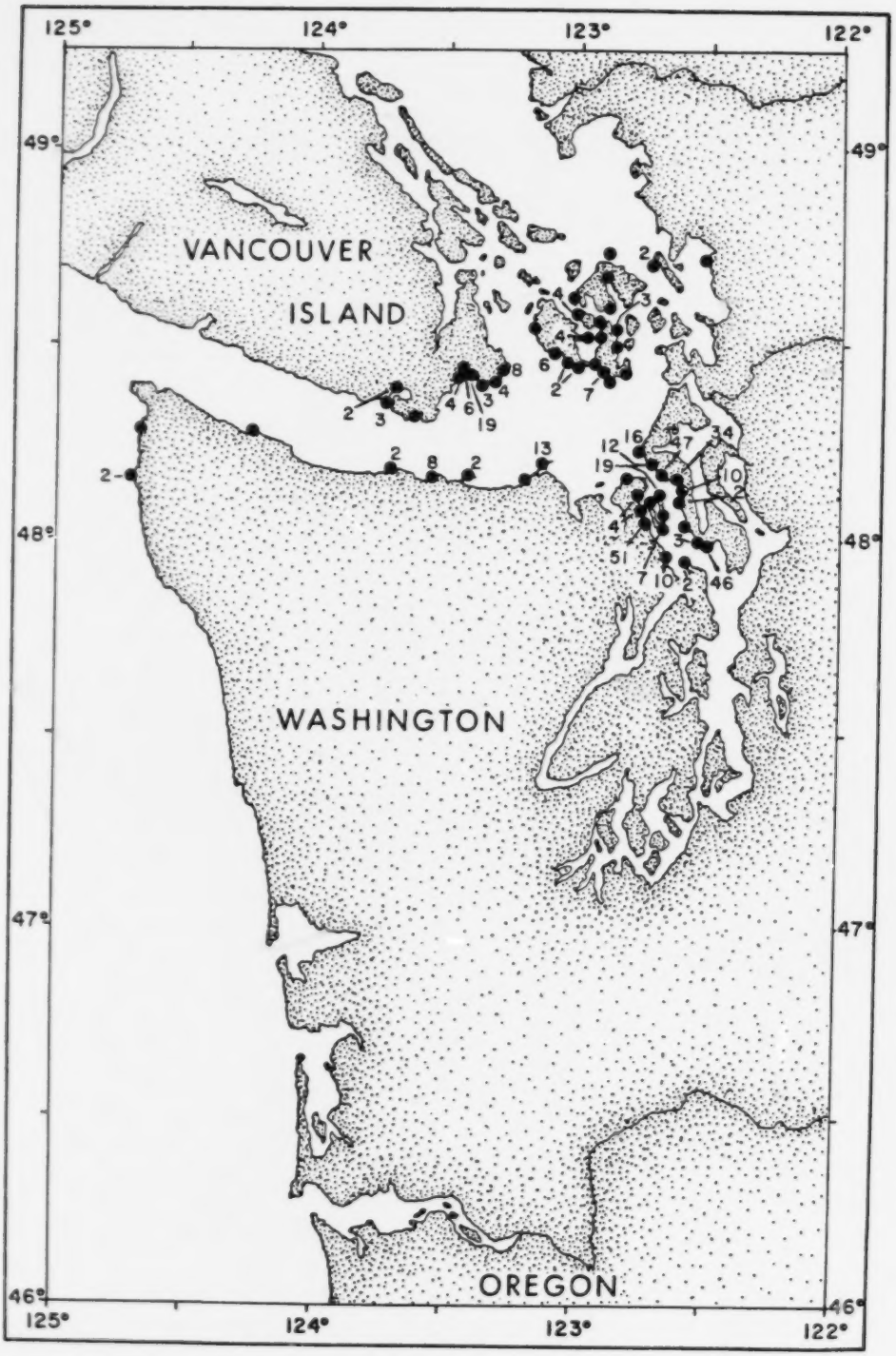

Figure 3.6. Recovery positions of drift cards released in Admiralty Inlet (sites 11-15; see Fig. 2.1). The cards were released during 1-2 July 1980. Notation: unnumbered dots, single recoveries; numbered dots, multiple recoveries with the number signifying the number of cards recovered.

TABLE 3.4. RECOVERIES OF DRIFT CARDS RELEASED IN ADMIRALTY INLET (SITES 11-15).

Site No.	First Card No.	# Released	# Recovered	PERCENT OF RECOVERIES BY AREAS: Whidbey Basin	Main Basin	Admiralty Inlet	Dungeness Spit	Victoria	Remaining Inner Strait	San Juan Islands	Outer Strait	Pacific Coast	Total % Recovered
a) Flood													
11	11000	100	39	0	0	69%(27)	10%(4)	0	8%(3)	13%(5)	0	0	39%
12	11100	100	41	0	0	53%(22)	0	15%(6)	12%(5)	10%(4)	10%(4)	0	41%
13	11200	100	36	0	0	53%(19)	14%(5)	14%(5)	9%(3)	5%(2)	0	5%(2)	36%
14	11300	100	42	0	0	46%(19)	0	26%(11)	2%(1)	17%(7)	7%(3)	2%(1)	42%
15	11400	100	40	0	0	55%(22)	0	12%(5)	15%(6)	15%(6)	3%(1)	0	40%
Total		500	198	0	0	55%(109)	4%(9)	14%(27)	9%(18)	12%(24)	4%(8)	2%(3)	40%
b) Ebb													
11	13000	100	30	0	0	67%(20)	10%(3)	0	13%(4)	10%(3)	0	0	30%
12	13100	99	52	0	0	87%(45)	0	0	2%(1)	11%(6)	0	0	53%
13	13200	100	49	0	0	39%(19)	4%(2)	23%(11)	16%(8)	16%(8)	0	2%(1)	49%
14	13300	100	48	0	0	54%(26)	4%(2)	15%(7)	10%(5)	15%(7)	0	2%(1)	48%
15	13400	100	63	0	0	90%(57)	2%(1)	3%(2)	2%(1)	3%(2)	0	0	63%
Total		499	242	0	0	69%(167)	3%(8)	8%(20)	8%(19)	11%(26)	0	1%(2)	48%
c) Total: Flood + Ebb		999	440	0	0	63%(276)	4%(17)	11%(47)	8%(37)	11%(50)	2%(8)	1%(5)	44%

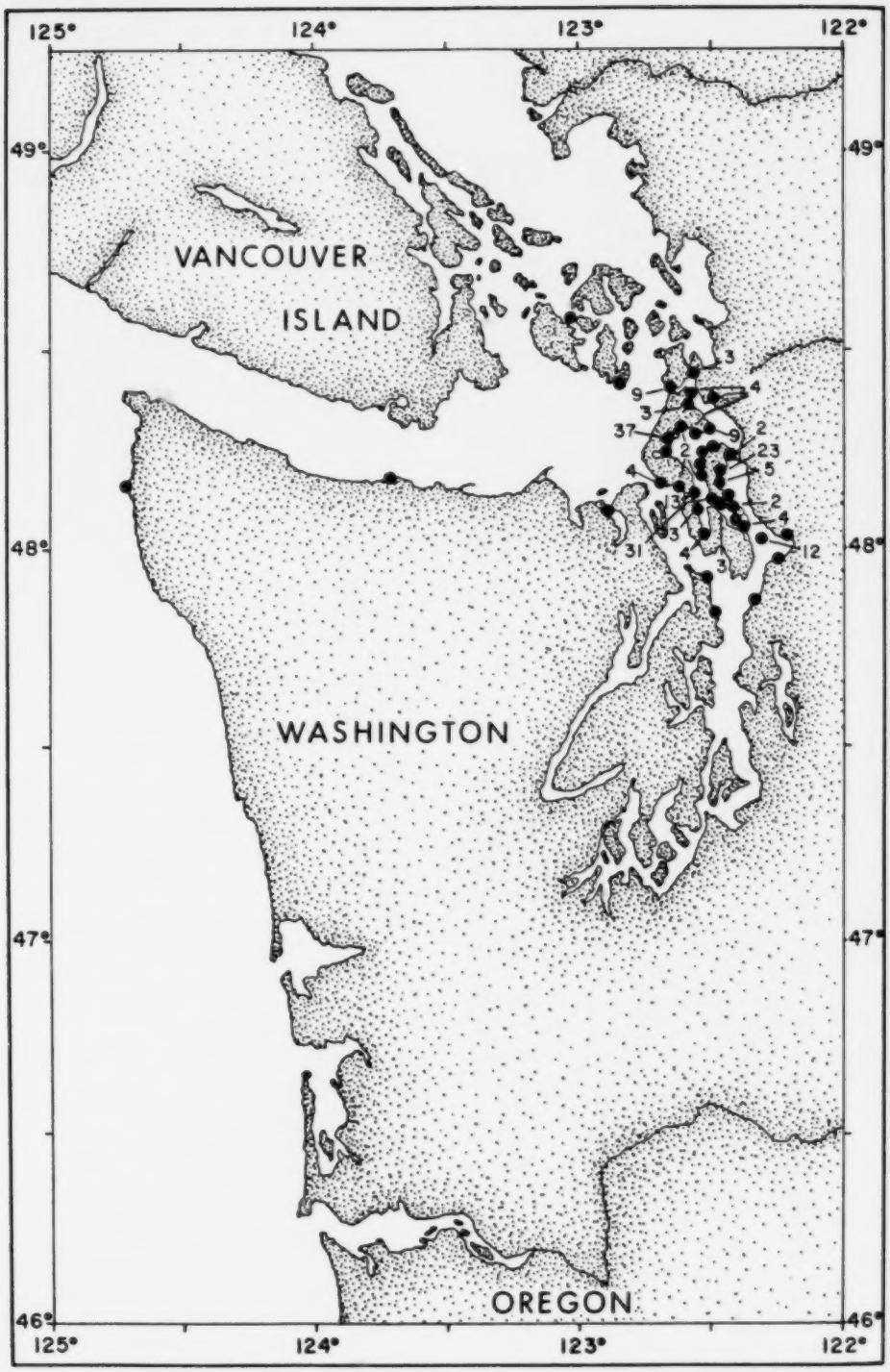

Figure 3.7. Recovery positions of drift cards released in Saratoga Passage (sites 16-18; see Fig. 2.1). The cards were released during 1-2 July 1980. Notation: unnumbered dots, single recoveries; and numbered dots, multiple recoveries with the number signifying the number of cards recovered.

TABLE 3.5. RECOVERIES OF DRIFT CARDS RELEASED IN SARATOGA PASSAGE (SITES 16-18).

Site No.	First Card No.	# Released	# Recovered	PERCENT OF RECOVERIES BY AREAS: Whidbey Basin	Main Basin	Admiralty Inlet	Dungeness Spit	Victoria	Remaining Inner Strait	San Juan Islands	Outer Strait	Pacific Coast	Total % Recovered
a) Flood													
16	11600	98	26	92%(24)	0	4%(1)	0	0	0	0	4%(1)	0	27%
17	11500	100	59	92%(54)	5%(3)	3%(2)	0	0	0	0	0	0	59%
18	11700	99	0	0	0	0	0	0	0	0	0	0	0
Total		297	85	92%(78)	3.5%(3)	3.5%(3)	0	0	0	0	1%(1)	0	29%
b) Ebb													
16	13500	100	57	98%(56)	0	0	0	0	0	0	0	2%(1)	57%
17	13600	99	40	93%(37)	0	0	0	0	2%(1)	5%(2)	0	0	40%
18	13700	100	18	83%(15)	0	17%(3)	0	0	0	0	0	0	18%
Total		299	115	94%(108)	0	2%(3)	0	0	1%(1)	2%(2)	0	1%(1)	38%
c) Total: Flood + Ebb		596	200	93%(186)	1.5%(3)	3%(6)	0	0	.5%(1)	1%(2)	.5%(1)	.5%(1)	34%

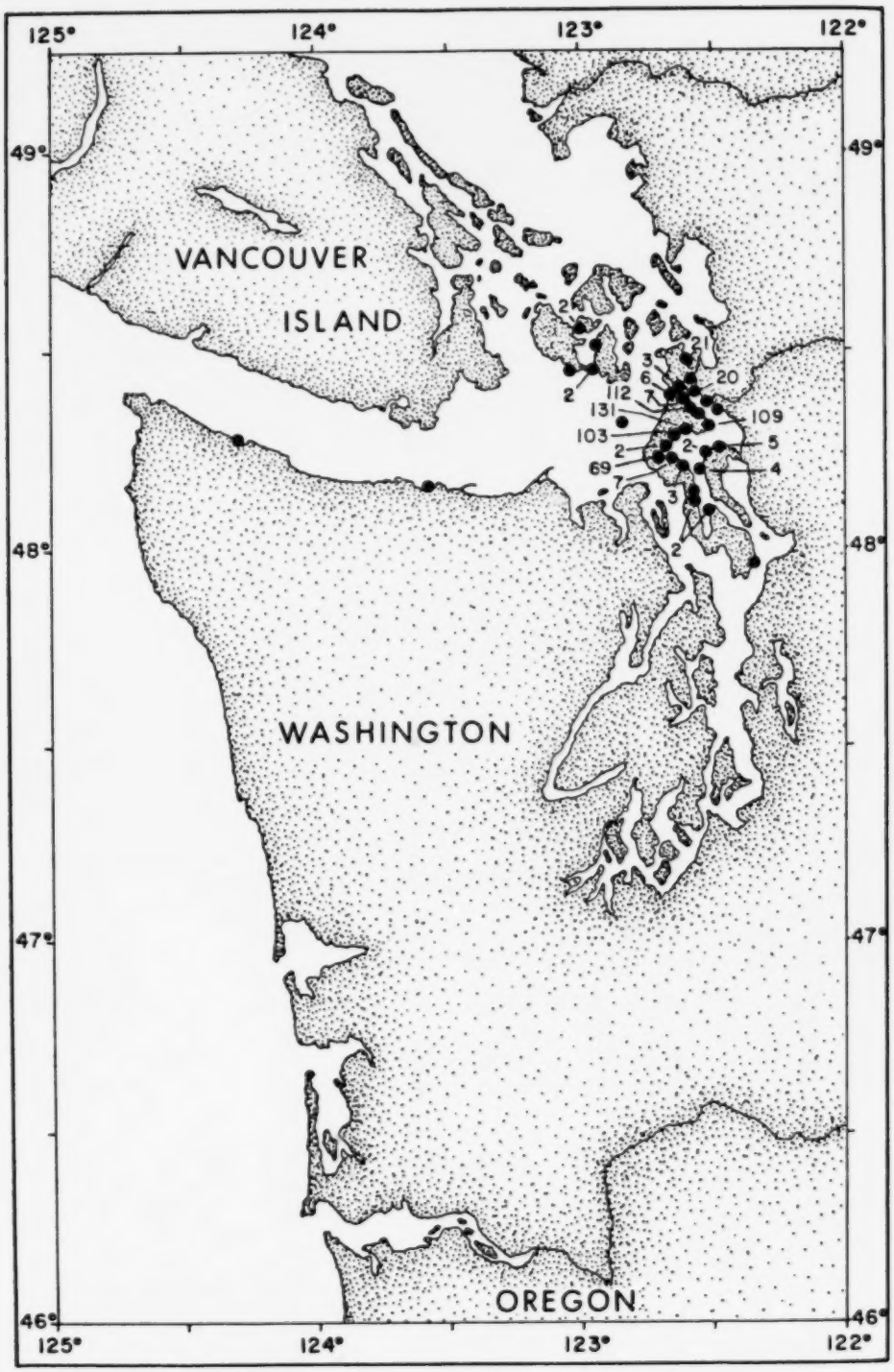

Figure 3.8. Recovery positions of drift cards released in Skagit Bay (sites 19-24; see Fig. 2.1). The cards were released during 1-2 July 1980. Notation: unnumbered dots, single recoveries; and numbered dots, multiple recoveries with the number signifying the number of cards recovered.

TABLE 3.6. RECOVERIES OF DRIFT CARDS RELEASED IN SKAGIT BAY (SITES 19-24).

Site No.	First Card No.	# Released	# Recovered	PERCENT OF RECOVERIES BY AREAS: Whidbey Basin	Main Basin	Admiralty Inlet	Dungeness Spit	Victoria	Remaining Inner Strait	San Juan Islands	Outer Strait	Pacific Coast	Total % Recovered
a) Flood													
19	14000	100	78	100%(78)	0	0	0	0	0	0	0	0	78%
20	11900	100	10	100%(10)	0	0	0	0	0	0	0	0	10%
21	11800	100	30	90%(27)	0	0	0	0	3%(1)	7%(2)	0	0	30%
22	14100	100	48	96%(46)	0	0	0	0	0	2%(1)	2%(1)	0	48%
Total		400	166	97%(161)	0	0	0	0	.5%(1)	2%(3)	.5%(1)	0	42%
b) Ebb													
19	14400	100	71	99%(70)	0	0	0	0	0	1%(1)	0	0	71%
20	13900	100	79	97%(77)	0	0	0	0	0	3%(2)	0	0	79%
21	13800	100	67	100%(67)	0	0	0	0	0	0	0	0	67%
22	14200	100	100	100%(100)	0	0	0	0	0	0	0	0	100%
23	14300	100	51	96%(49)	0	0	0	0	2%(1)	2%(1)	0	0	51%
24	14500	100	88	100%(88)	0	0	0	0	0	0	0	0	88%
Total		600	456	99%(451)	0	0	0	0	- (1)	1%(4)	0	0	76%
c) Total: Flood + Ebb		1000	622	99%(612)	0	0	0	0	- (2)	1%(7)	- (1)	0	62%

4. CURRENTS AND WINDS

As an aid to interpretation of the drift card recoveries observations of currents and winds were analyzed.

4.1 NET CURRENTS

Historical observations of currents (0-6 m depth) are contained in several published sources as well as in original unpublished records. These sources were obtained where possible and net speeds and directions were computed. A summary of these observations is contained in Appendix C. Patterns of near surface (0-6 m depth) net currents within portions of Puget Sound, the Strait of Juan de Fuca, San Juan Islands, and the Strait of Georgia are shown in Figures 4.1 and 4.2, respectively.

In Haro and Rosario Straits (Fig. 4.1) the net flow is southward. The flow from Rosario Strait continues into the inner Strait of Juan de Fuca southward along the western shore of Whidbey Island where it merges with the northwesterly flow from Admiralty Inlet. The flow from Haro Strait turns toward the west near Victoria and exits through the outer Strait of Juan de Fuca. The combined flows from Admiralty Inlet and Rosario Strait traverse the inner Strait of Juan de Fuca from Point Partridge to near Victoria where they join the southward flow from Haro Strait. At the junction of these flows some water turns toward the channel between San Juan and Lopez Islands, while the majority joins the flow from Haro Strait and continues into the outer Strait of Juan de Fuca. A countercurrent to the net seaward flow exists between Port Angeles Harbor and Dungeness Spit.

The net flows southward along Whidbey Island from Rosario Strait and northwestward from Admiralty Inlet across the inner Strait of Juan de Fuca are consistent with an average current pattern obtained over 5.5 days using high frequency radar (Frisch, 1980; p. 12).

The flow from Puget Sound (Fig. 4.2) exits primarily through Admiralty Inlet to the inner Strait of Juan de Fuca. A secondary flow exits from Whidbey Basin into the inner Strait via Deception Pass. In Whidbey Basin there is a null zone (see Collias et al., 1973) located off the Skagit River delta. North of the delta the net flow is northward thru Deception Pass into the inner Strait. South of the delta the net flow exits southward to a three way junction of Admiralty Inlet, the Main Basin, and Whidbey Basin. In the Main Basin the net surface flow is northward and continues through Admiralty Inlet into the inner Strait of Juan de Fuca (see Barnes and Ebbesmeyer, 1978; Cannon and Laird, 1980). Mean surface currents in Hood Canal are also northward and exit into Admiralty Inlet.

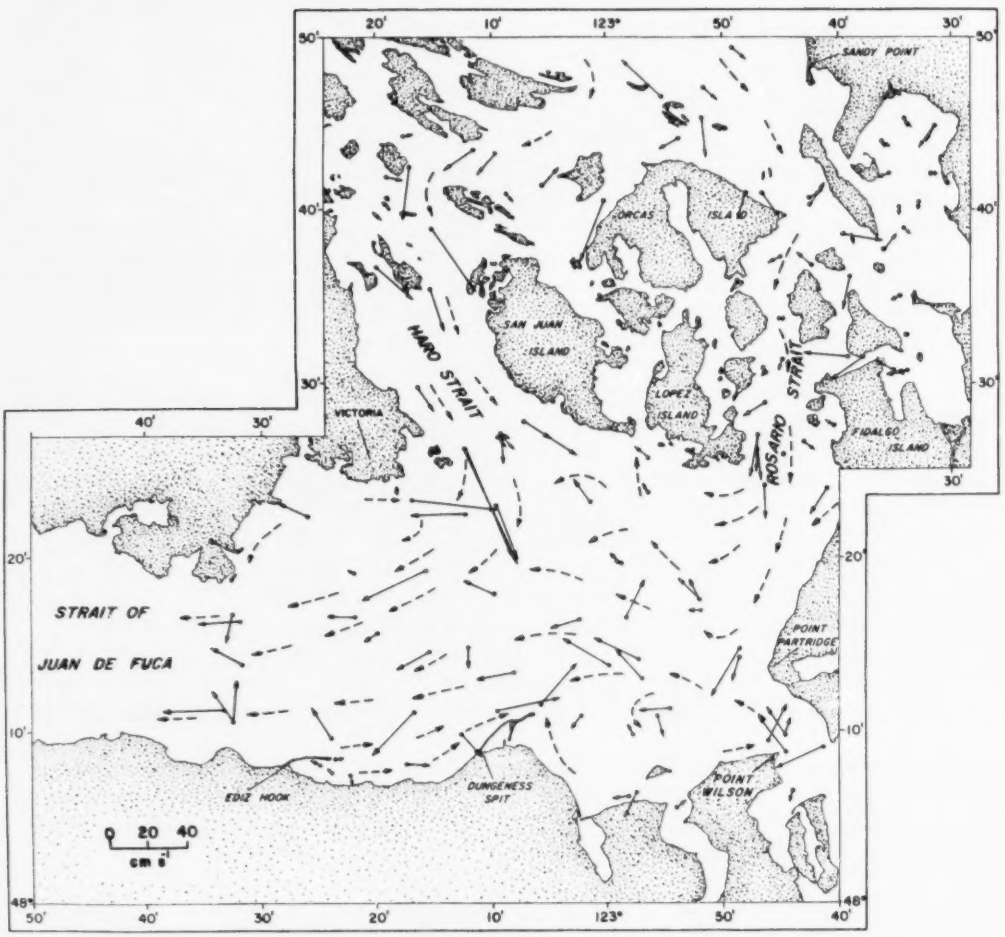

Figure 4.1. Near surface (0-6 m depth) net currents in the inner Strait of Juan de Fuca, San Juan Islands, and lower Strait of Georgia. Notation: solid arrows, net currents computed from current meter records taken at the location of the dots: and dashed arrows, net currents inferred by the authors. Speeds associated with solid arrows are indicated by inset scale; no speeds are associated with dashed arrows. Sources and statistics of each current meter record are listed in Appendix C.

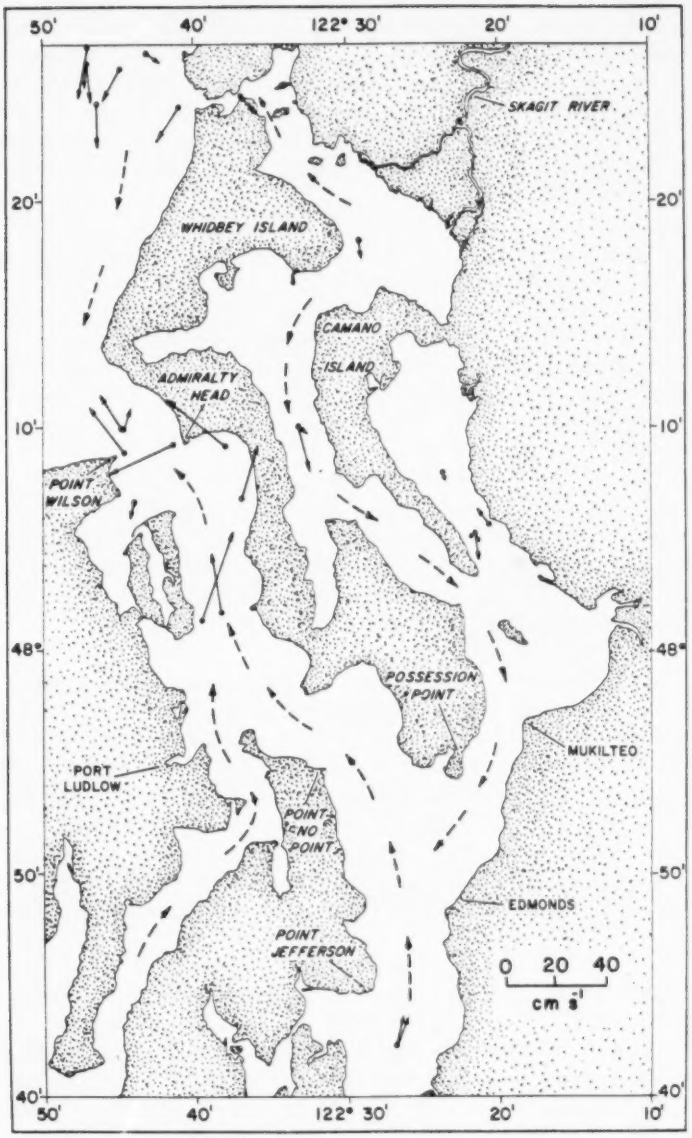

Figure 4.2. Near surface (0-6 m depth) net currents in portions of Puget Sound. Notation: solid arrows, net currents computed from current meter records taken at the location of the dots; and dashed arrows, net currents inferred by the authors. Speeds associated with solid arrows are indicated by inset scale; no speeds are associated with dashed arrows. Sources and statistics of each current meter record are listed in Appendix C.

Some effects of mean currents were evident in the recoveries of drift cards. Particularly prominent is the countercurrent between Port Angeles Harbor and Dungeness Spit. Approximately two-thirds of the recoveries from drift cards released in the vicinity of Port Angeles were carried to Dungeness Spit. The effect of the countercurrent is also evident in the recoveries of drift cards released on flood and ebb at Port Angeles. Cards released on ebb tide in 1980 required a longer time to be found on Dungeness Spit than those released on flood tide (see Appendix B for dates and times of card recoveries).

Another prominent route for drift cards lies between Admiralty Inlet and the San Juan Islands and between Admiralty Inlet and Victoria. Figure 4.1 shows a possible net flow from near Point Partridge to the San Juan Islands through the channel between San Juan and Lopez islands. A relatively large number of cards were found in this area suggesting the possibility of a northward net flow through this channel. A considerable number of these cards came from site 10, or conversely 33-37% of the cards recovered from releases at site 10 were found in this area.

The connection to Victoria is less clear. Ninety-seven of 112 cards reaching Victoria came from releases in or at the mouth of Admiralty Inlet. These cards probably travel across the inner Strait of Juan de Fuca with the net flow out of Admiralty Inlet and then possibly are dispersed to shore at Victoria by nearshore tidal eddies or winds.

In Whidbey Basin a number of drift cards were carried by the southerly net flow southward into the northern portions of Puget Sound's Main Basin and some were diverted into Port Susan. The cards found in Admiralty Inlet could have reached there by either the southerly flow in Whidbey Basin or via the northerly flow through Deception Pass and then the southerly flow along the western shores of Whidbey Island. Since the cards found in Admiralty Inlet were all released at sites 16-18 where a southerly net surface flow predominates, we speculate that most cards arrived in Admiralty Inlet directly from Whidbey Basin rather than via the inner Strait of Juan de Fuca.

One additional observation is noteworthy. Though the absence of drift card recoveries in some areas may be due to the experimental biases described earlier (see Section 2.1), it may also be due in part or in whole to strong net surface currents opposing the movement of cards into these areas. In particular few cards were found in the Main Basin of Puget Sound where the net surface flow is strongly northward (approximately 15 cm/s; Ebbesmeyer and Barnes, 1980). A similar low number of recoveries were reported in the Strait of Georgia and Haro and Rosario Straits. These passages have strong net surface flows southward into the inner Strait of Juan de Fuca.

4.2 WINDS

Weekly mean winds at 19 stations in northwestern Washington and Canada (Fig. 4.3; Table 4.1) during 1 July-31 August 1980 are shown in Appendix D. Daily mean winds during the same period are listed in Appendix E.

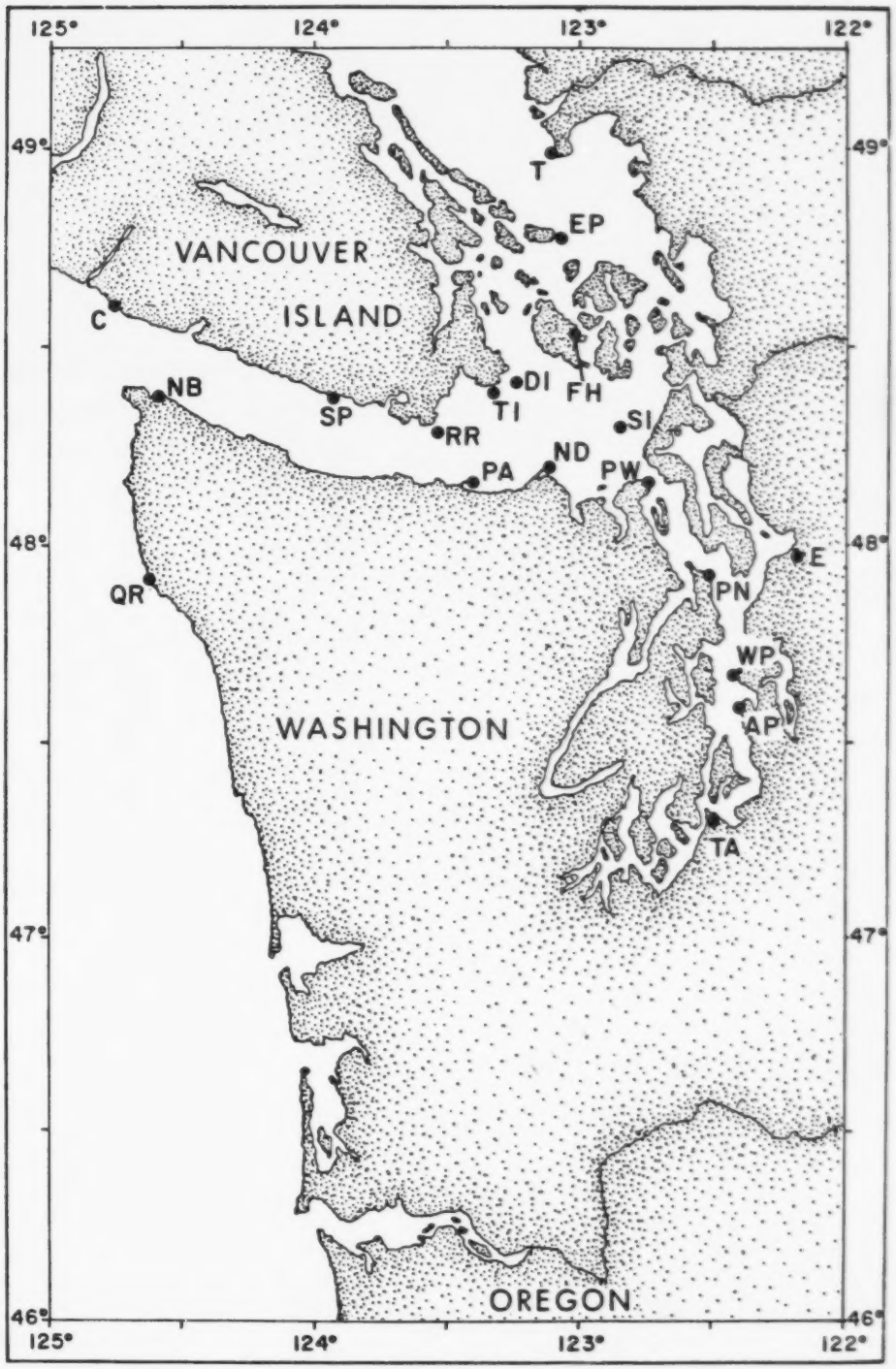

Figure 4.3. Locations of wind observations during 1 July-31 August 1980. Station names and positions are listed in Table 4.1.

TABLE 4.1. WIND STATION LOCATIONS

Symbol	Station Name	Latitude	Longitude
AP	Alki Pt.	47° 34.6'N	122° 25.2'W
C	Carmanah Pt.	48° 38.7'N	124° 45.0'W
DI	Discovery Is.	48° 25.5'N	123° 13.5'W
EP	East Pt.	48° 47.0'N	123° 02.7'W
E	Everett	47° 54.0'N	122° 12.1'W
FH	Friday Harbor	48° 32.0'N	123° 01.4'W
NB	Neah Bay	48° 22.2'N	124° 35.8'W
ND	New Dungeness	48° 10.8'N	123° 06.5'W
PA	P.A. CG Office	48° 08.4'N	123° 24.5'W
PN	Pt. No Pt.	47° 54.8'N	122° 31.6'W
PW	Pt. Wilson	48° 08.7'N	122° 45.2'W
QR	Quillayute R.	47° 54.7'N	124° 37.3'W
RR	Race Rocks	48° 17.9'N	123° 31.7'W
SP	Sheringham Pt.	48° 22.6'N	123° 55.2'W
SI	Smith Is.	48° 19.1'N	122° 50.6'W
TA	Tacoma	47° 17.7'N	122° 30.6'W
TI	Trial Is.	48° 23.7'N	123° 18.3'W
T	Tsawwassen	49° 00.3'N	123° 07.6'W
WP	West Pt.	47° 39.8'N	122° 26.1'W

During this period the predominate winds were eastward through the Strait of Juan de Fuca, southward through the Strait of Georgia and San Juan Islands, and variable in Puget Sound. The southerly blowing winds in the Strait of Georgia act in the same direction as net surface currents, thereby aiding the seaward movement of drift cards and retarding their movement into the Strait of Georgia. The winds from the west through the Strait of Juan de Fuca generally oppose net surface currents and would act to retard the seaward movement of the drift cards. In both areas the predominate winds oppose the movement of drift cards out of the inner Strait of Juan de Fuca.

5. SUMMARY AND CONCLUSIONS

In order to evaluate possible trajectories of floating oil within the Strait of Juan de Fuca and Puget Sound 5257 drift cards were released during both flood and ebb tides at 26 sites along portions of the proposed routes of two crude oil pipelines. A total of 2296 (44%) of the drift cards released were reported by the public before 30 September 1980 as being recovered over a wide area including the Pacific coasts of Washington, Oregon, and Vancouver Island, the Strait of Juan de Fuca, San Juan Islands, and Puget Sound.

The areas where most drift cards were found may be summarized as follows:

A. Releases in the vicinity of Port Angeles: approximately one-half of the recoveries from releases during both 1978 and 1980 were found on Dungeness Spit. The remaining half recovered from 1978 releases were primarily found on the western shores of Whidbey Island, in the San Juan Islands, and in Whidbey Basin. The majority of the remaining cards recovered from 1980 releases were found westward of Dungeness Spit and on the Pacific Coast.

B. Releases in the vicinity of Protection Island: approximately one-third of the recoveries were found on Dungeness Spit, one-quarter in the outer Strait of Juan de Fuca, and approximately one-half were found at other points along the Strait of Juan de Fuca.

C. Releases across the mouth of Admiralty Inlet: 83% of those cards recovered were found in four areas: 13% in Admiralty Inlet, 15% in the San Juan Islands, 23% near Victoria, and 32% along the southern shore in the Strait of Juan de Fuca westward from the tip of Dungeness Spit.

D. Releases in Admiralty Inlet: two-thirds of the cards recovered were found in Admiralty Inlet itself and one-fifth were found at Victoria and the San Juan Islands.

E. Releases in Saratoga Passage: 93% of the recoveries were found within Whidbey Basin, in Port Susan (16%), and in Saratoga Passage and the Skagit Bay (77%). Those found in Admiralty Inlet and Puget Sound's Main Basin totaled 3% and 2% of the recoveries, respectively.

F. Releases in Skagit Bay: 99% of the cards recovered were found in Whidbey Basin. The majority of these beached in northern Saratoga Passage and in Skagit Bay.

In general, comparatively few of all cards recovered were found on the Pacific Coast. Of the cards recovered from releases in the vicinity of Port Angeles, Protection Island, and the mouth of Admiralty Inlet, only 6% were found on the Pacific coasts of Vancouver Island, Washington, and Oregon. Just 1% of the cards recovered from releases in Admiralty Inlet, Saratoga Passage, and Skagit Bay were found on the Pacific Coast. Conversely 94% and 99% of the cards recovered from the aforementioned release points were found inland of the mouth of the Strait of Juan de Fuca. These numbers strongly suggest that should oil be discharged into marine surface waters along the two proposed crude oil pipeline routes, the majority of it that goes aground will beach on inland shores rather than on the coast of the Pacific Ocean.

ACKNOWLEDGEMENTS

We are indebted to the personnel of NOAA's PMEL and MESA offices for handling the collection of, and responses to, those drift card recoveries reported by the public. In particular Sharon L. Wright and David J. Pashinski of PMEL tabulated recovery information for cards released in 1978, while Sharon A. Giese of MESA received and responded to over 2000 letters and telephone calls for cards released in 1980. Ronald P. Kopenski assisted in the release of cards both in 1978 and 1980, and plotted the majority of those cards recovered from the 1980 releases.

Maps and other graphics were drawn by Terry L. Storms. Current meter records were supplied by personnel of the Environmental Protection Agency, National Ocean Survey, and NOAA.

Most of all, the authors would like to thank the thousands of people who took the time and effort to collect and report the drift cards.

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REFERENCES

Barnes, C.A., and C.C. Ebbesmeyer. 1978. Some aspects of Puget Sound's circulation and water properties. In: Estuarine Transport Processes (B. Kjerfve, ed.), University of South Carolina Press. p. 209-228.

Cannon, G.A. 1973. Observations of currents in Puget Sound, 1970. National Oceanic and Atmospheric Administration Technical Report ERL 260-POL 17. 77 pp.

Cannon, G.A., and N.P. Laird. 1980. Characteristics of flow over a sill during deep water renewal. In: Fjord Oceanography (H.J. Freeland, D.M. Farmer, and C.D. Levings, eds.), Plenum Publishing Corporation. p. 549-556.

Collias, E.E., C.A. Barnes, and J.H. Lincoln. 1973. Skagit Bay Study dynamical oceanography final report. University of Washington Department of Oceanography. 197 pp.

Cox, J.M., C.C. Ebbesmeyer, and J.M. Helseth. 1978. Surface drift sheet movements observed in the inner Strait of Juan de Fuca, August 1978. National Oceanic and Atmospheric Administration Technical Memorandum ERL MESA-35. 104 pp.

Ebbesmeyer, C.C., J.M. Helseth, and J.M. Cox. 1977. Surface drifter movements observed in outer Strait of Juan de Fuca, July 1977. National Oceanic and Atmospheric Administration Technical Memorandum ERL MESA-22.

Ebbesmeyer, C.C., J.M. Cox, and J.M. Helseth. 1978. Surface drifter movements observed in Port Angeles Harbor and vicinity, April 1978. National Oceanic and Atmospheric Administration Technical Memorandum ERL MESA-31. 200 pp.

Ebbesmeyer, C.C., J.M. Cox, J.M. Helseth, L.R. Hinchey, and D.W. Thomson. 1979. Dynamics of Port Angeles Harbor and approaches, Washington. Department of Commerce/Environmental Protection Agency Report No. EPA-600/7-79-252. 107 pp.

Ebbesmeyer, C.C., and C.A. Barnes. 1980. Control of a fjord basin's dynamics by tidal mixing in embracing sill zones. Estuarine and Coastal Marine Science. 10(11): 311-330.

Frisch, Shelby. 1980. HF radar measurements of circulation in the eastern Strait of Juan de Fuca near Protection Island (July, 1979). Puget Sound Energy-Related Research Project, Department of Commerce/ Environmental Protection Agency Report No. EPA-600/7-80-129. 133 pp.

Hardy, C.C., E.R. Baylor, and P. Moskowitz. 1976. Sea surface circulation in the northwest apex of the New York Bight. National Oceanic and Atmospheric Administration Technical Memorandum ERL MESA-13. 132 pp.

Holbrook, J.R., R.D. Muench, D.G. Kachel, and C. Wright. 1980. Circulation in the Strait of Juan de Fuca: Recent oceanographic observations in the eastern basin. National Oceanic and Atmospheric Administration Technical Report ERL 412-PMEL 33. 42 pp.

Laird, N.P., and J.A. Galt. 1975. Observations of currents and water properties in Puget Sound, 1973. National Oceanic and Atmospheric Administration Technical Report ERL 327-PMEL 23. 141 pp.

National Ocean Survey. Unpublished (a). Data obtained from NOAA at Sandpoint, Seattle, Washington.

National Ocean Survey. Unpublished (b). Data obtained from NOS, Rockville, Maryland.

National Ocean Survey. 1976. Puget Sound approaches circulatory survey data report, October 1973-April 1975. 104 pp.

Pashinski, D.J., and R.L. Charnell. 1979. Recovery record for surface drift cards released in the Puget Sound-Strait of Juan de Fuca system during calendar year 1976-1977. National Oceanic and Atmospheric Administration Technical Memorandum ERL PMEL-14. 30 pp.

Pease, C.H., R.J. Stewart, and J.E. Overland. 1979. Report on FY-78 numerical modeling in the Strait of Juan de Fuca and Puget Sound. National Oceanic and Atmospheric Administration Technical Memorandum ERL MESA-38. 32 pp.

Schumacher, J.D., and R.M. Reynolds. 1975. STD, current meter, and drogue observations in Rosario Strait, January-March, 1974. National Oceanic and Atmospheric Administration Technical Report ERL 333-PMEL 24. 212 pp.

Stewart, R.J. 1978. Oil spill trajectory predictions for the Straits of Juan de Fuca and the San Juan Islands for the Bureau of Land Management's review of the Northern Tier Pipeline Company's proposal. 43 pp. (unpublished manuscript).

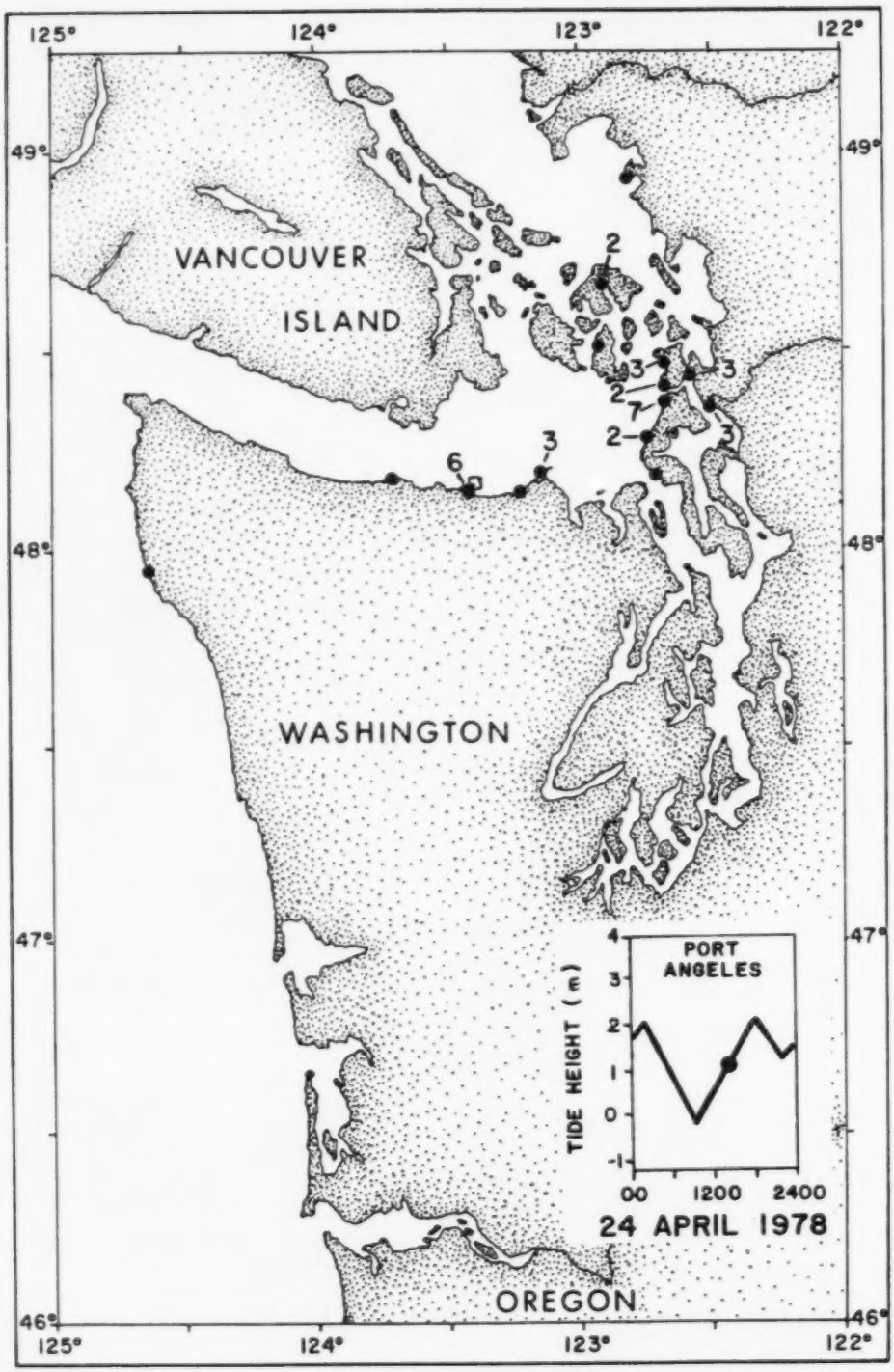
Tollefson, R., J.G. Denison, and E. Tokar. 1971. Outfall location studies-Port Angeles, Washington. ITT Rayonier Olympic Research Division Report No. H10:1-3 Case 1230-16, Project 119:116 dated 30 August 1971.

University of Washington Department of Oceanography. 1963 (unpublished). Data obtained from Eugene E. Collias.

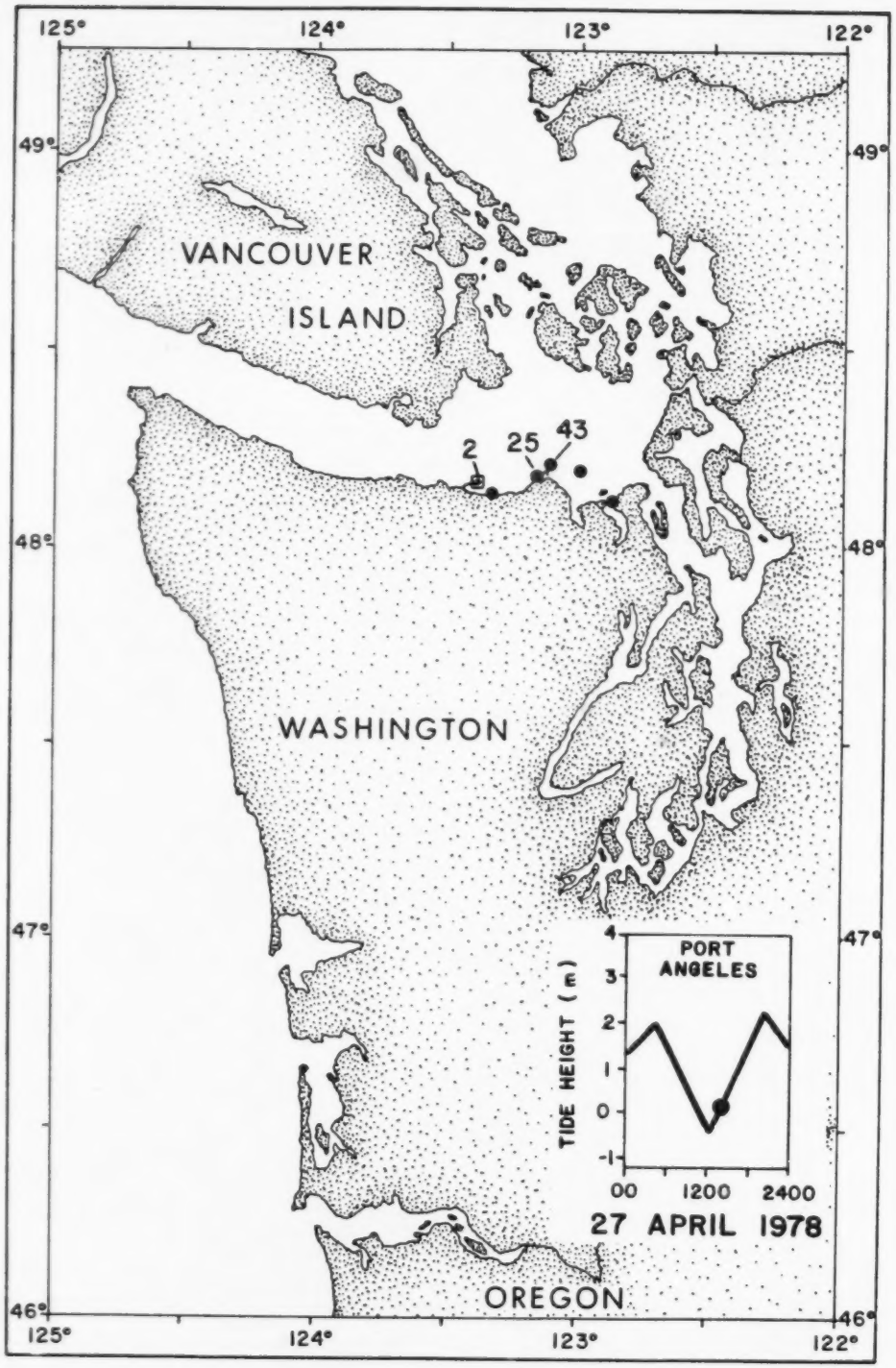
U.S. Department of the Interior, Bureau of Land Management. 1979. Final environmental statement, crude oil transportation systems proposed by Northern Tier Pipeline Company, Northwest Energy Company, Kitimat Pipeline Ltd., and Trans-Mountain Oil Pipeline Corporation. 4 volumes and summary.

APPENDIX A

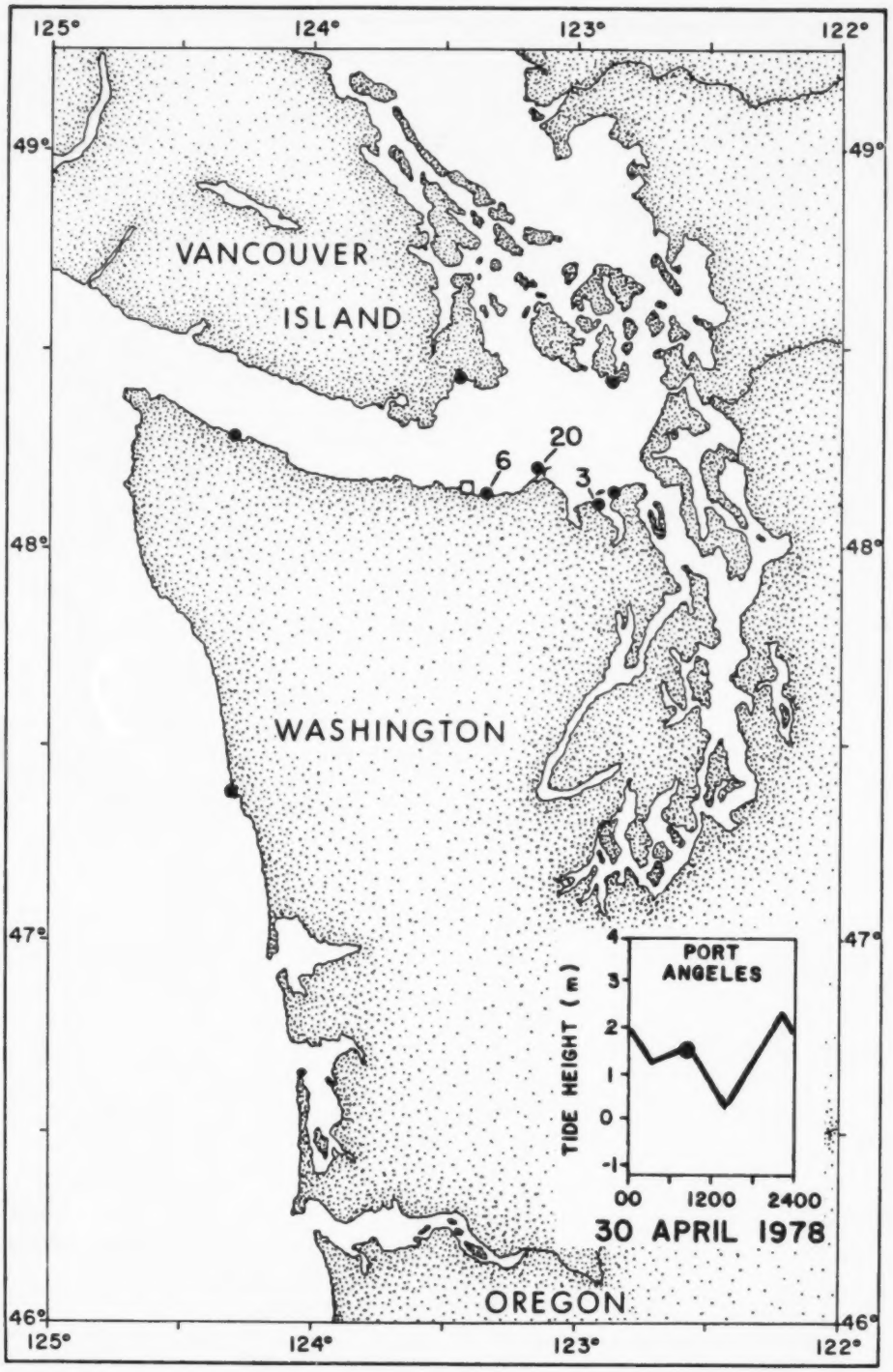
Maps of the Recovery Positions of Drift Cards Reported to NOAA before 30 September 1980. Maps are in Order by Release Sites. Notation: Open Square, Release Site (Generally 100 Cards Released per Site); Unnumbered Dots, Single Recoveries; and Numbered Dots, Multiple Recoveries with the Number Signifying the Number of Cards Recovered. Inset Shows Tidal Phase at Time of Release (Dot). Dates and Times are in Pacific Daylight Time.



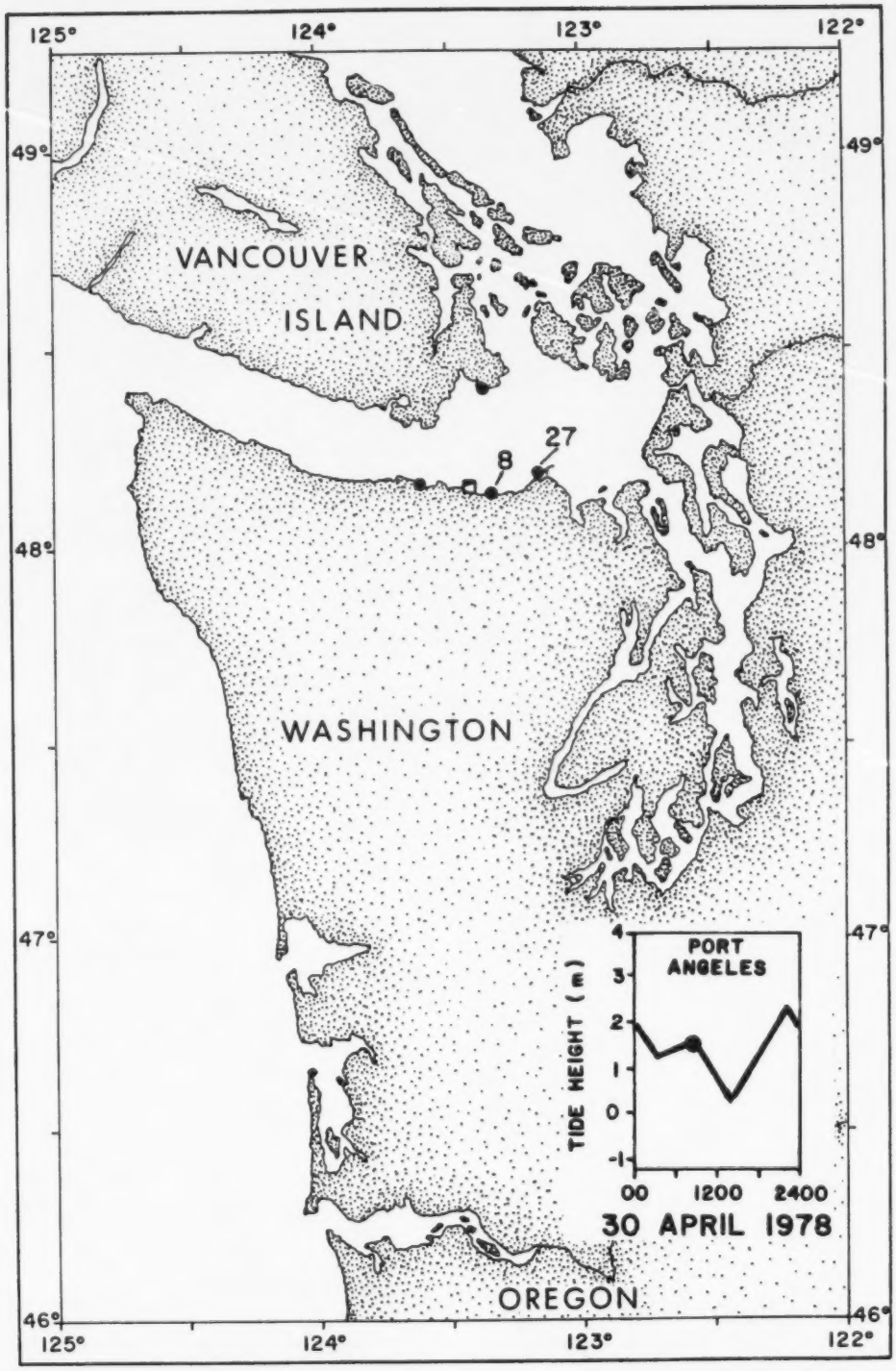
Appendix A.1. Recovery positions of drift cards numbered 9001-9100 released at Site A.



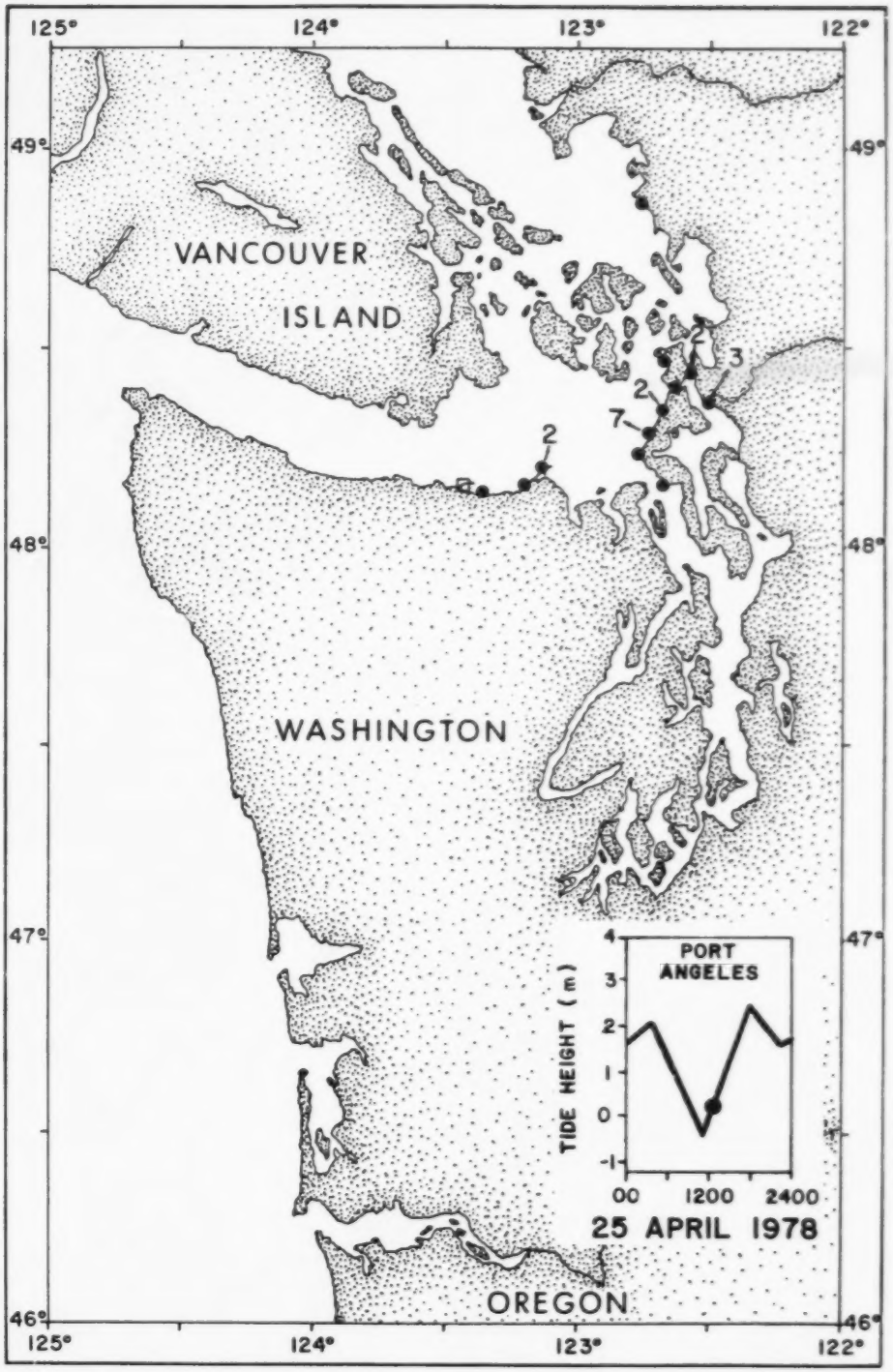
Appendix A.2. Recovery positions of drift cards numbered 9301-9400 released at Site A.



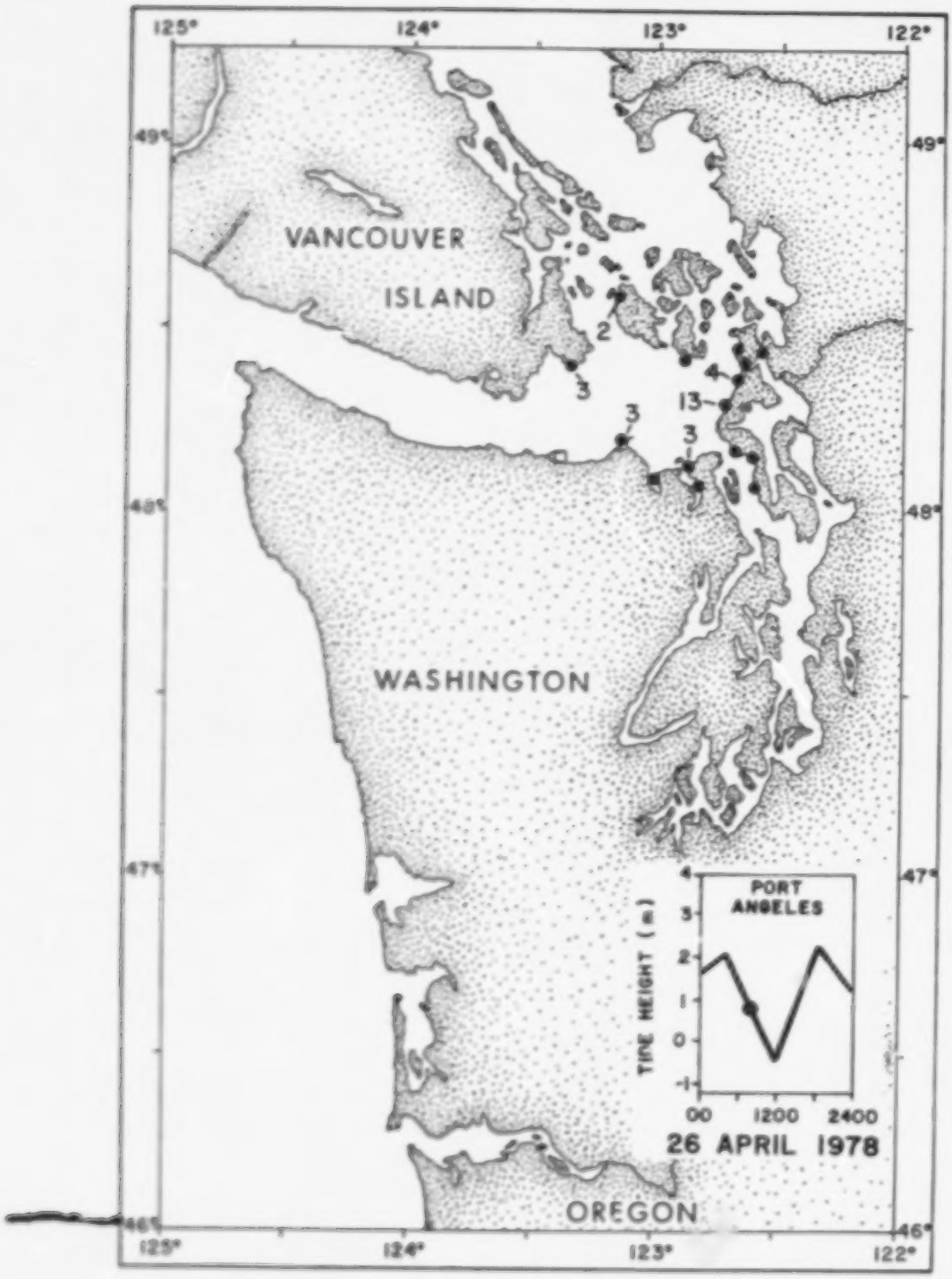
Appendix A.3. Recovery positions of drift cards numbered 9501-9600 released at Site A.



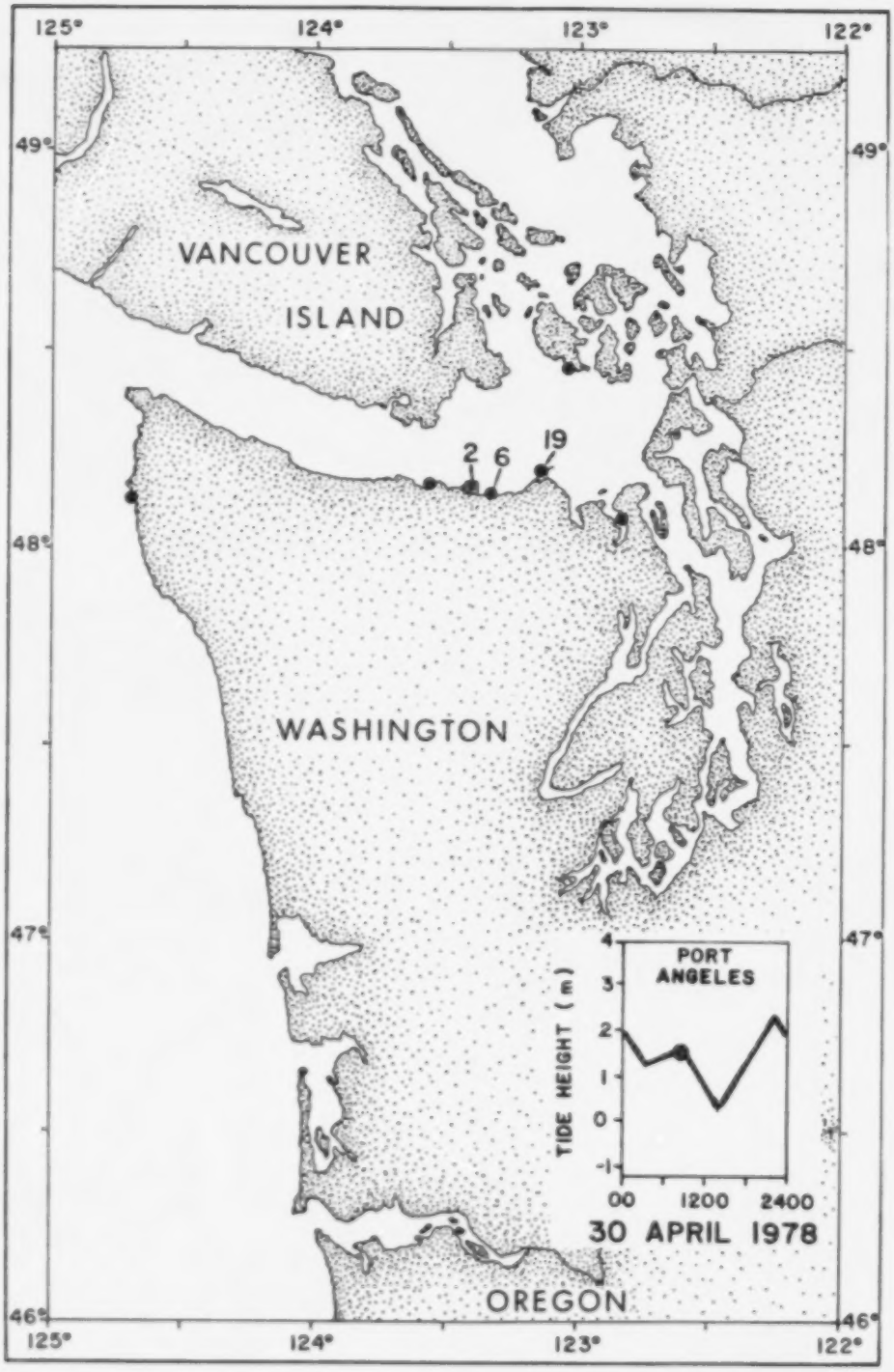
Appendix A.4. Recovery positions of drift cards numbered 9601-9700 released at Site A. One recovery at 48° 58.5'N, 125° 37.0'W is off map.



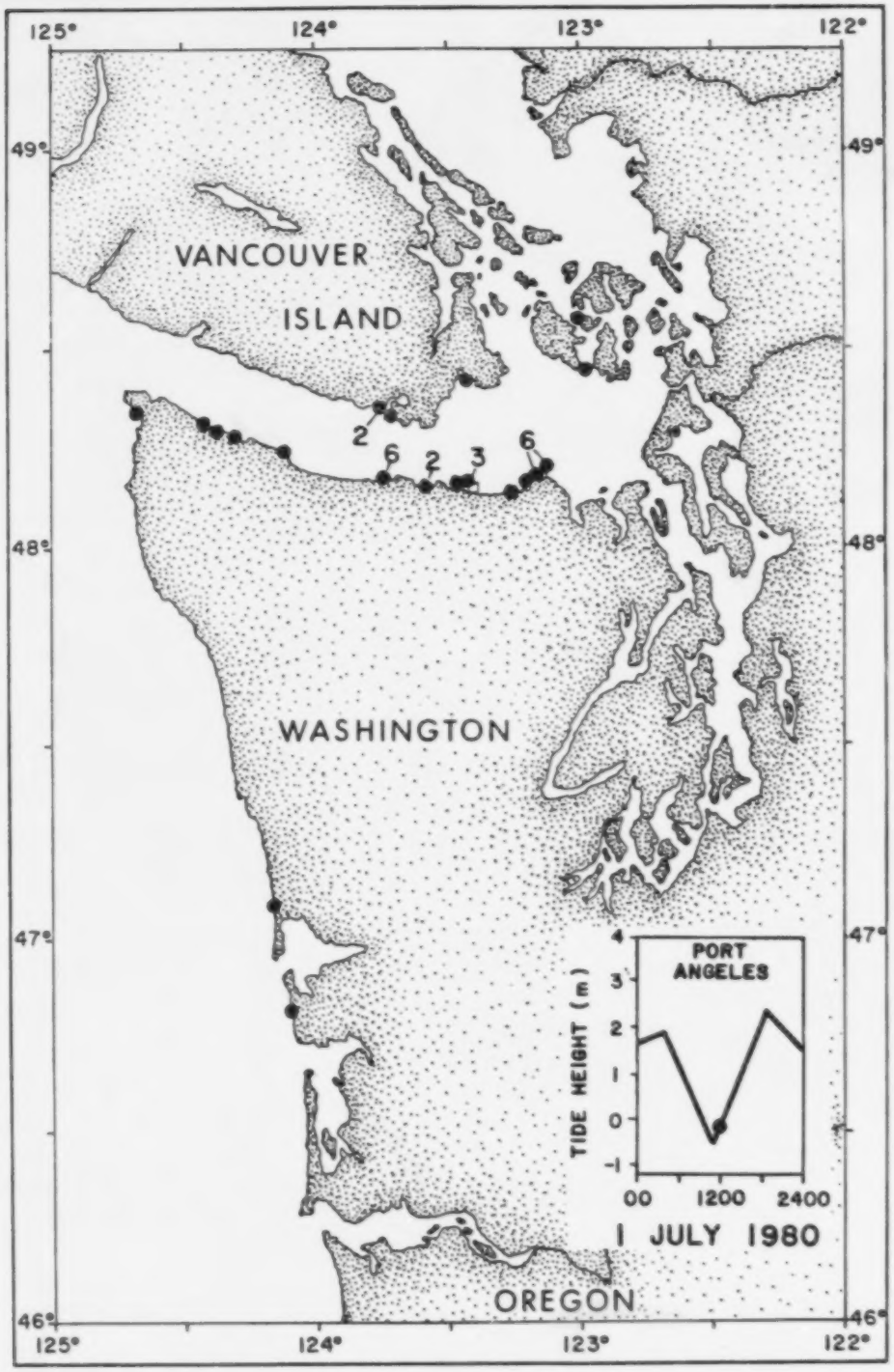
Appendix A.5. Recovery positions of drift cards numbered 9101-9200 released at Site B.



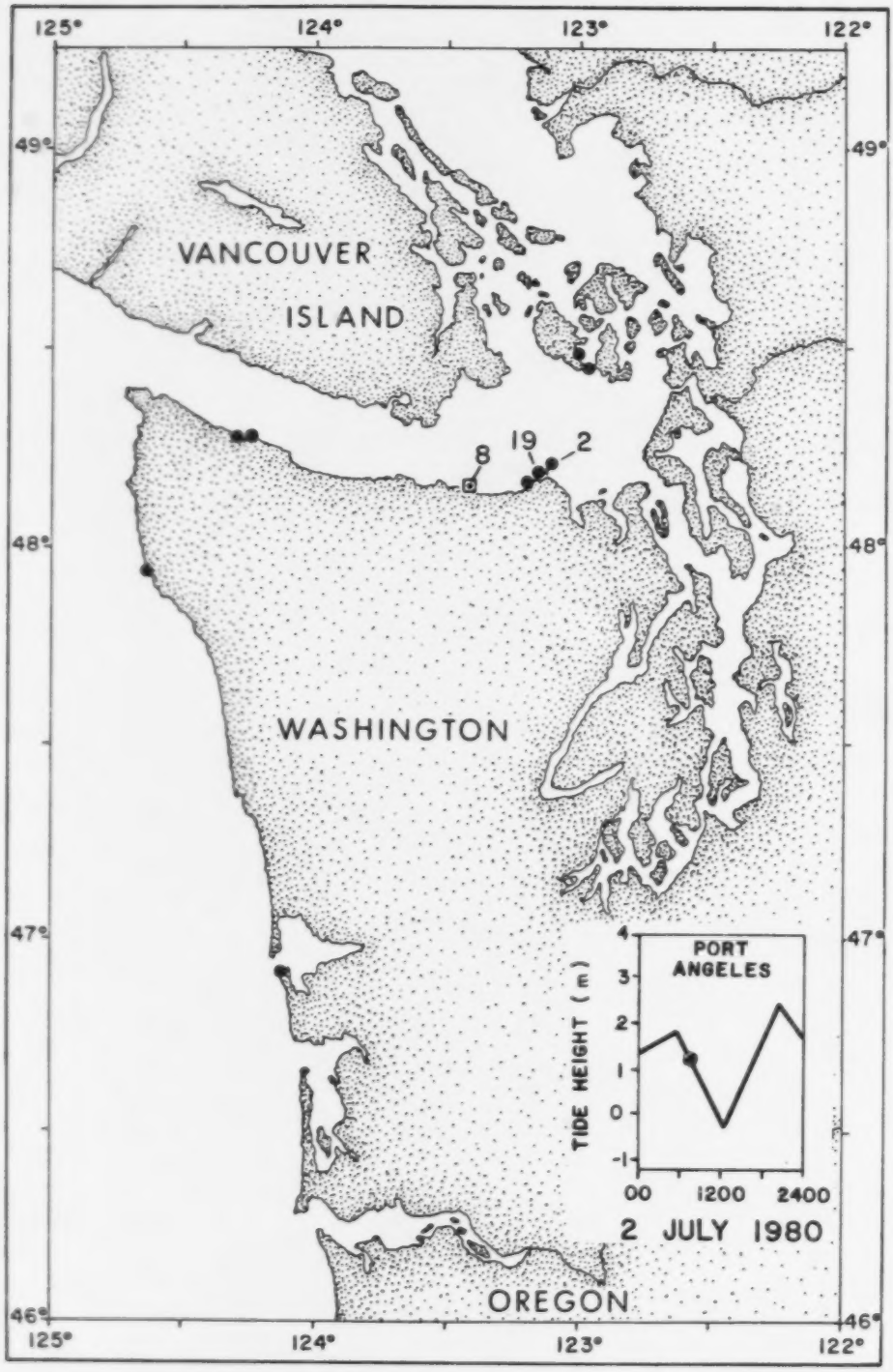
Appendix A.6. Recovery positions of drift cards numbered 9201-9300 released at Site B.



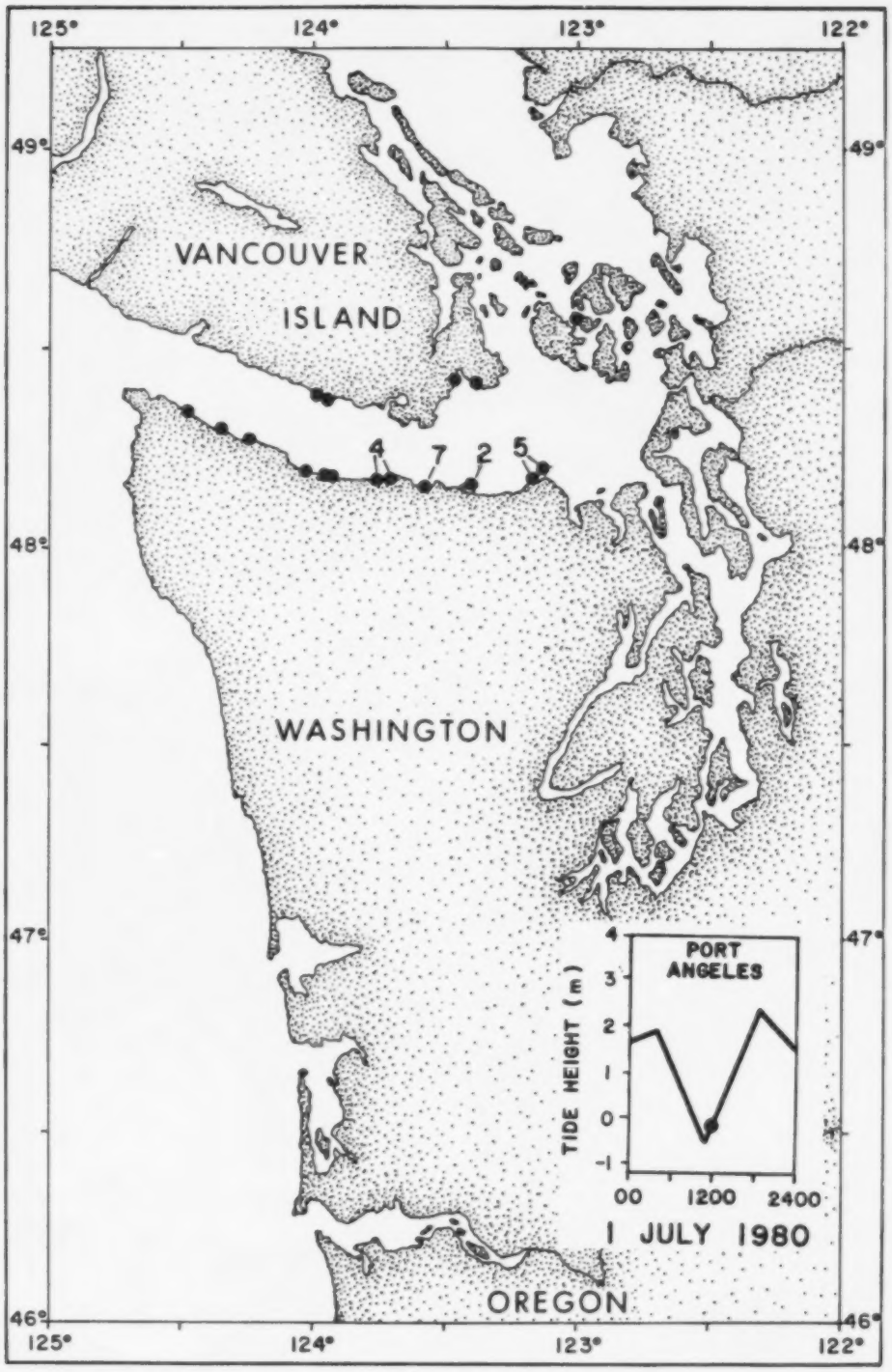
Appendix A.7. Recovery positions of drift cards numbered 9401-9500 released at Site B.



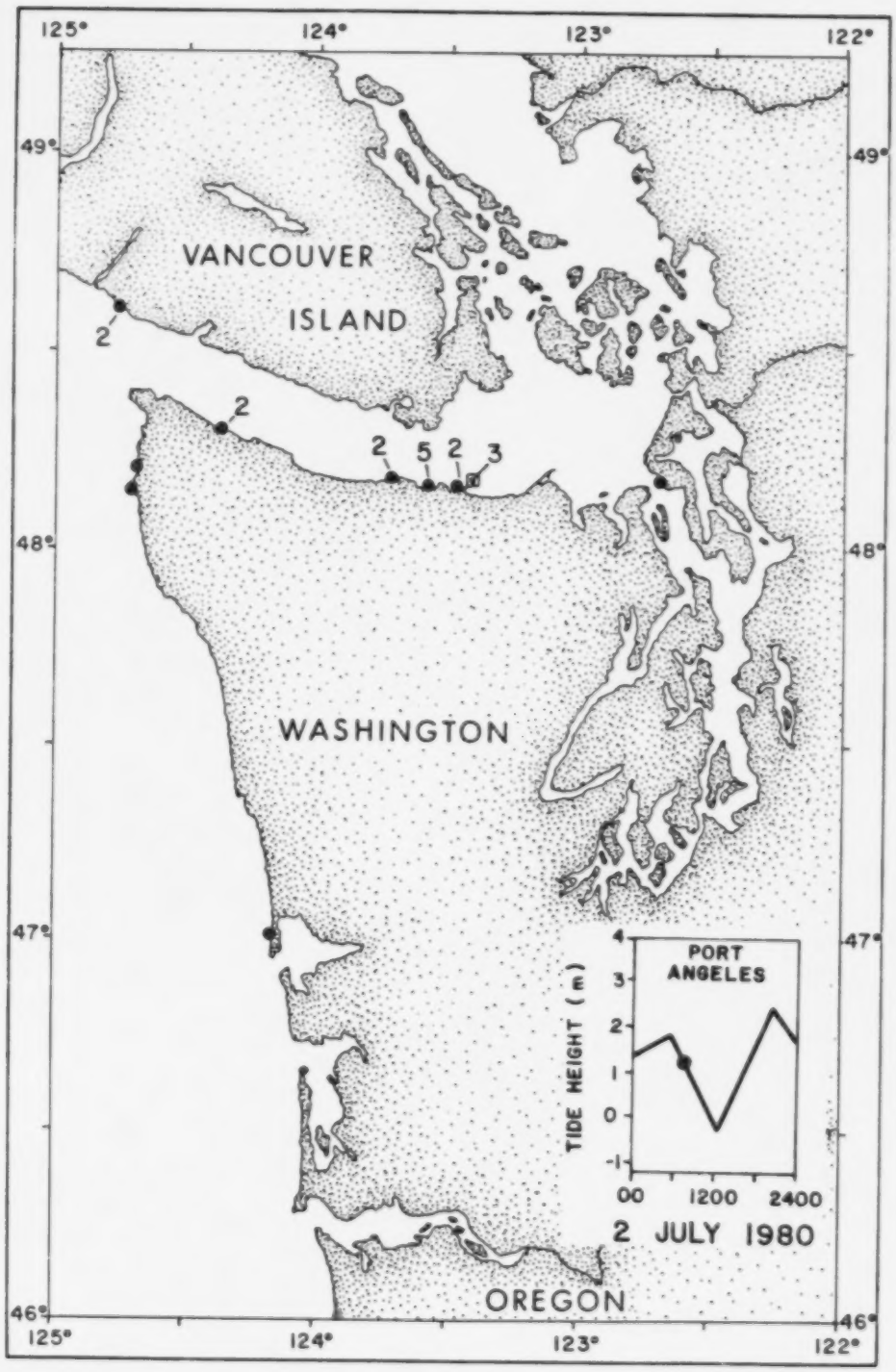
Appendix A.8. Recovery positions of drift cards numbered 10300-10399 released at Site 1.



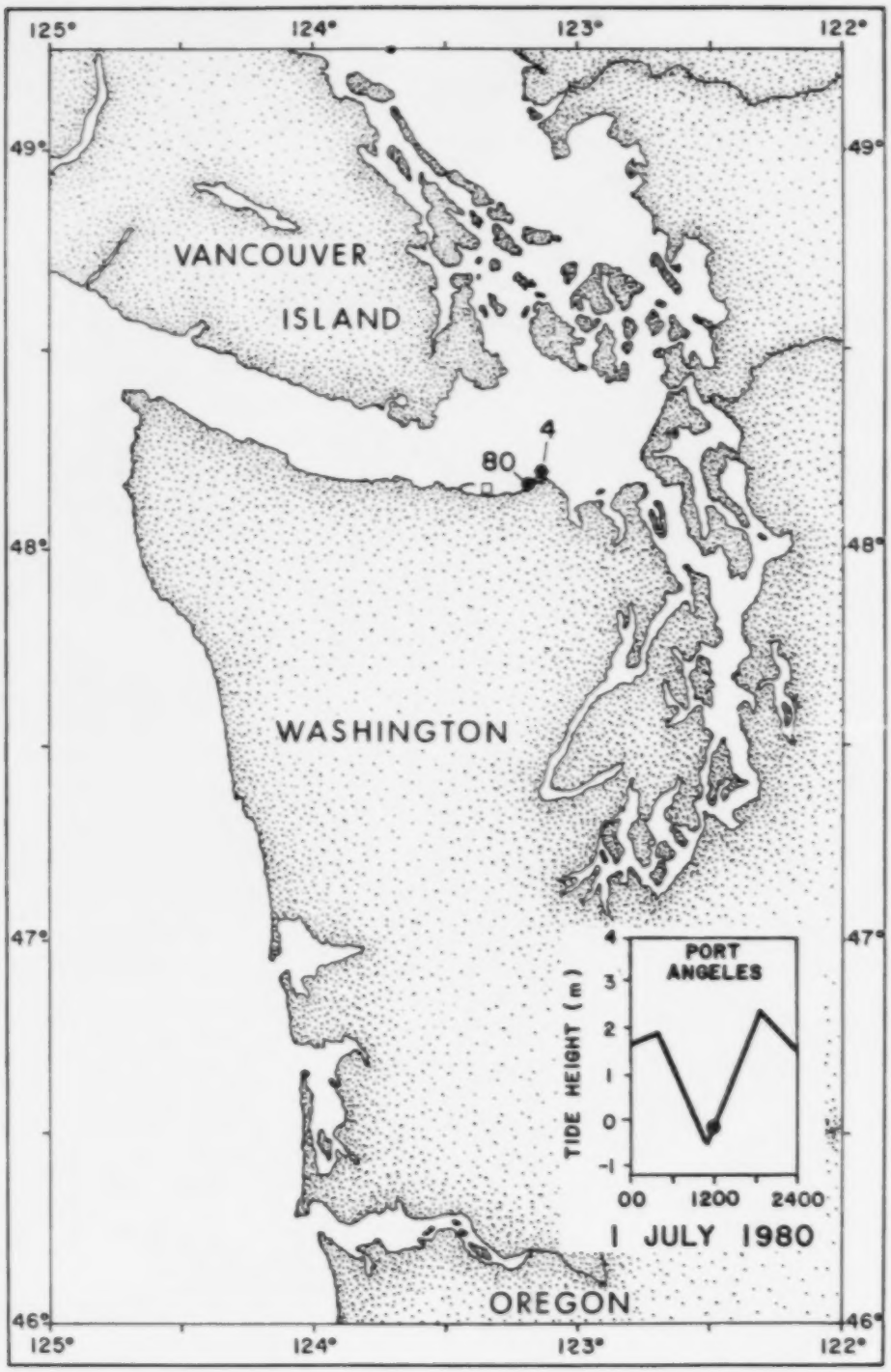
Appendix A.9. Recovery positions of drift cards numbered 12300-12399 released at Site 1. One recovery at 45° 28.0'N, 123° 9.2'W is off map.



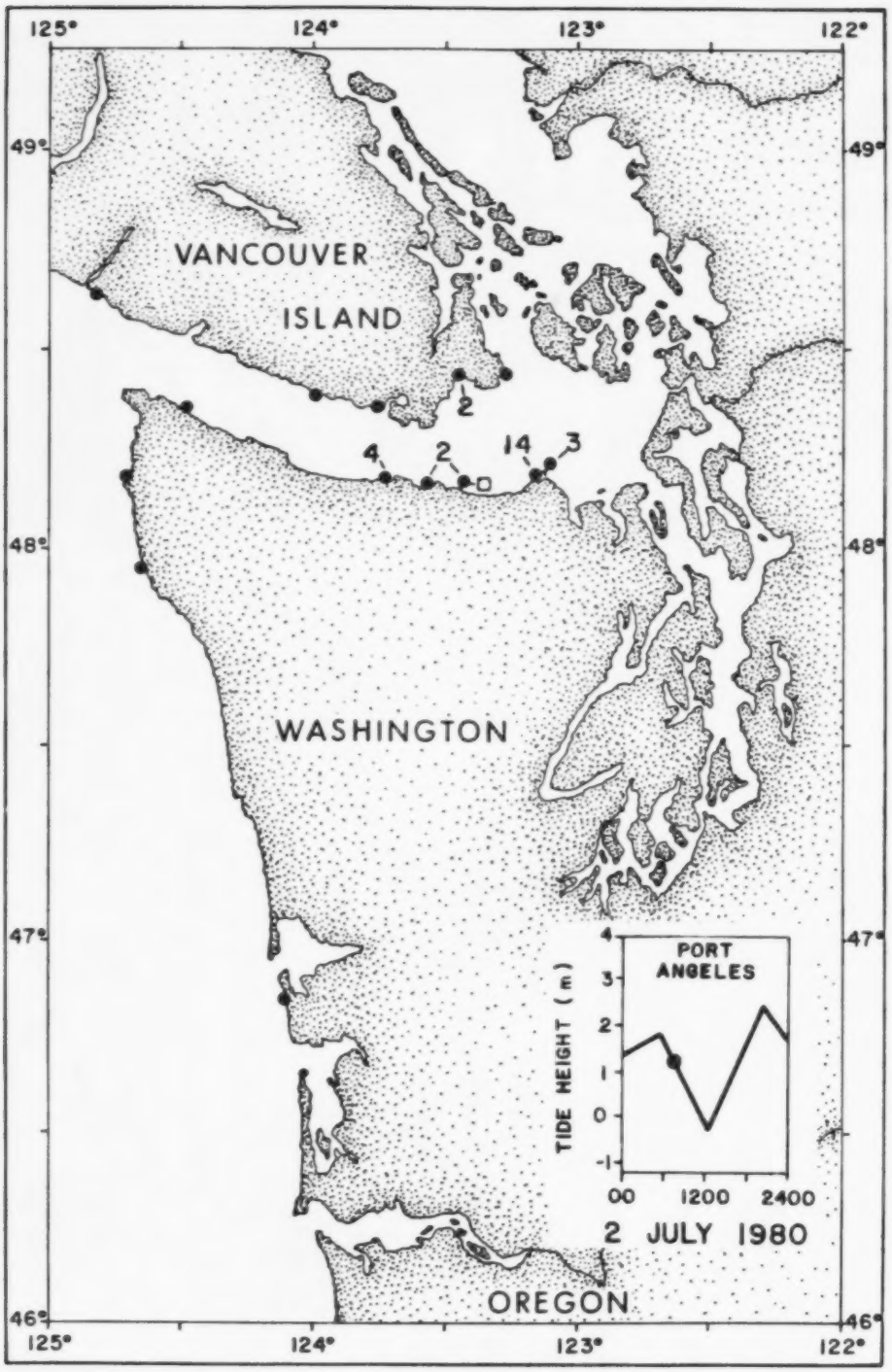
Appendix A.10. Recovery positions of drift cards numbered 10200-10299 released at Site 2.



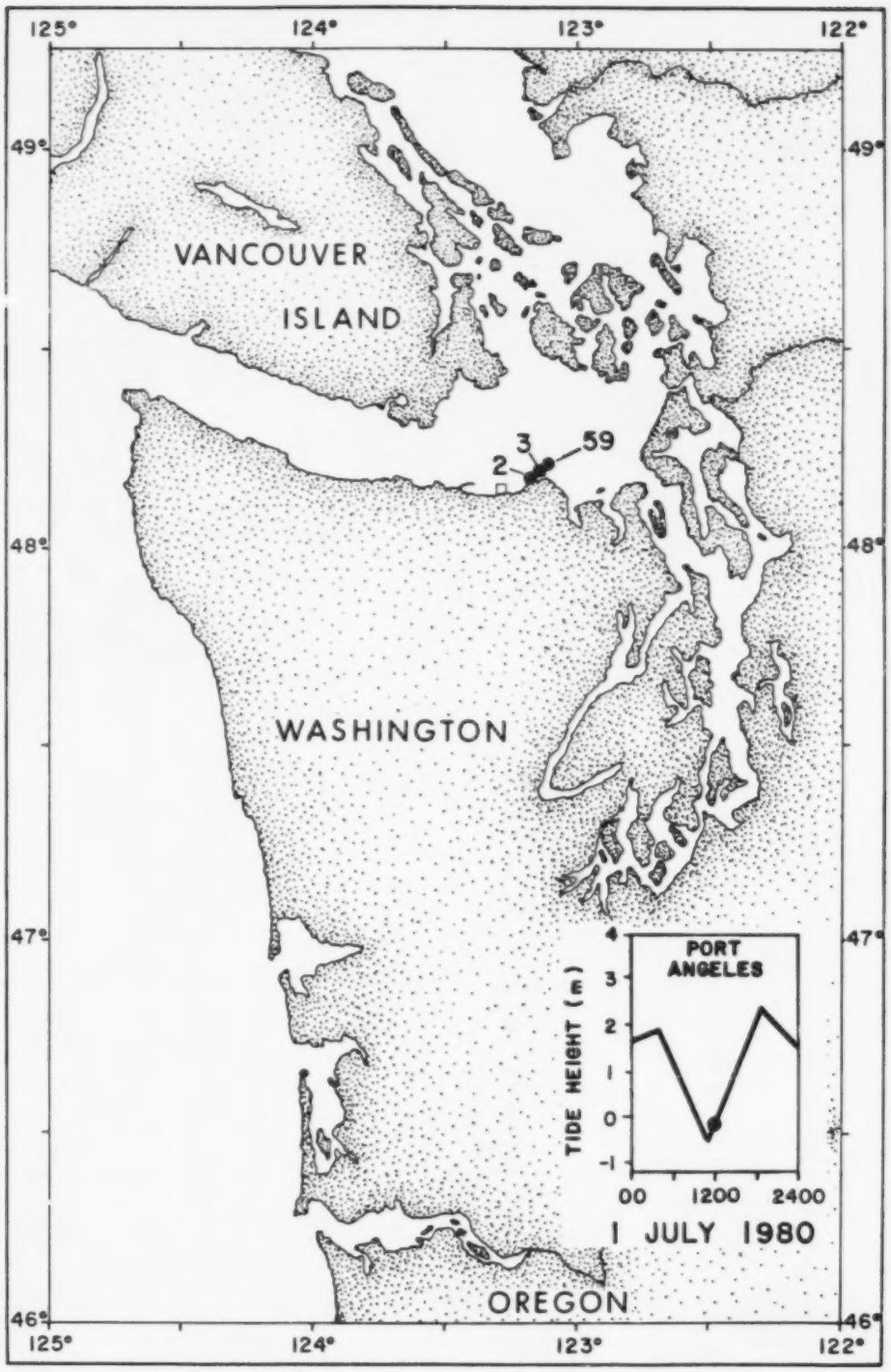
Appendix A.11. Recovery positions of drift cards numbered 12200-12299 released at Site 2.



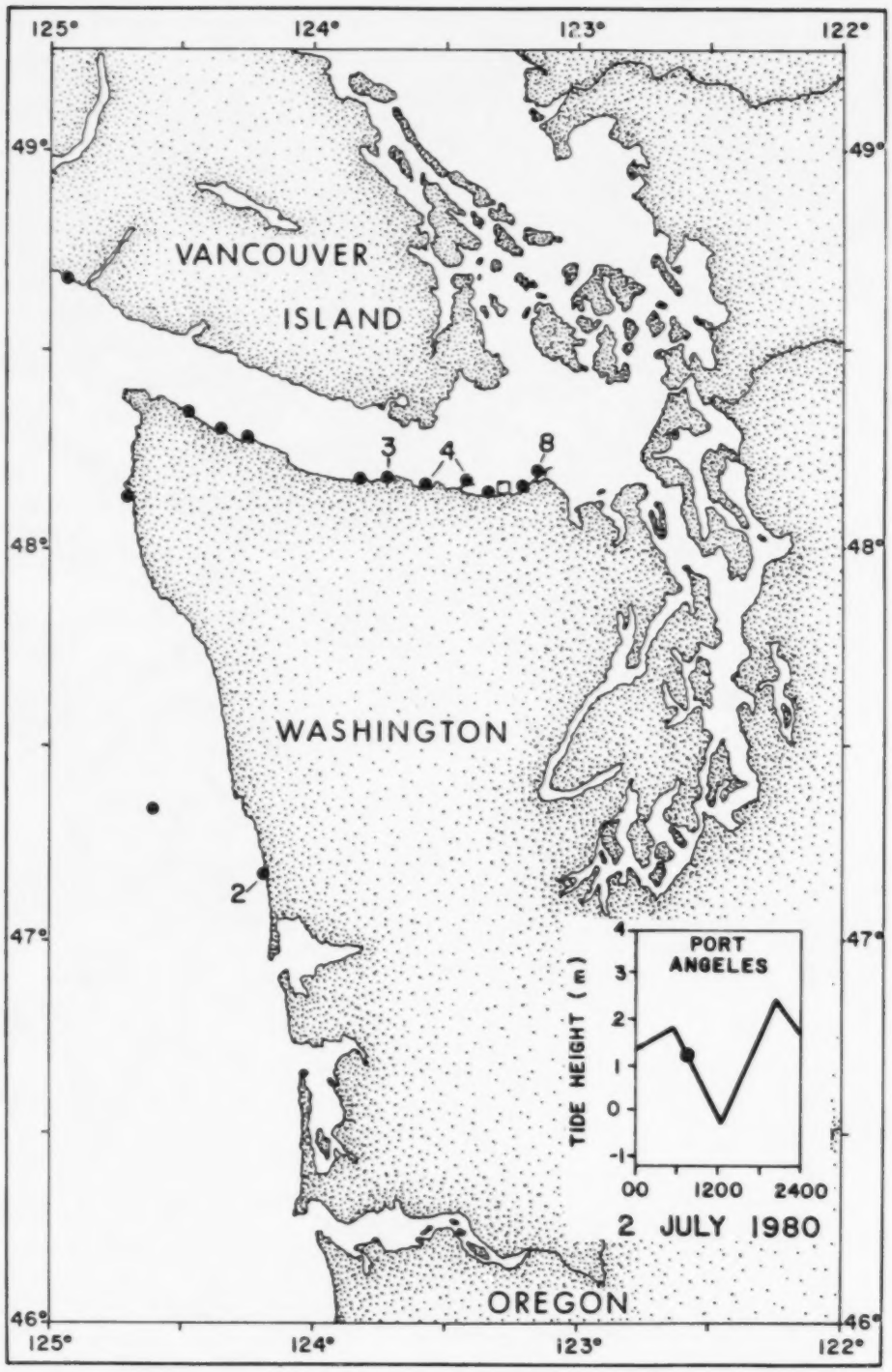
Appendix A.12. Recovery positions of drift cards numbered 10100-10199 released at Site 3.



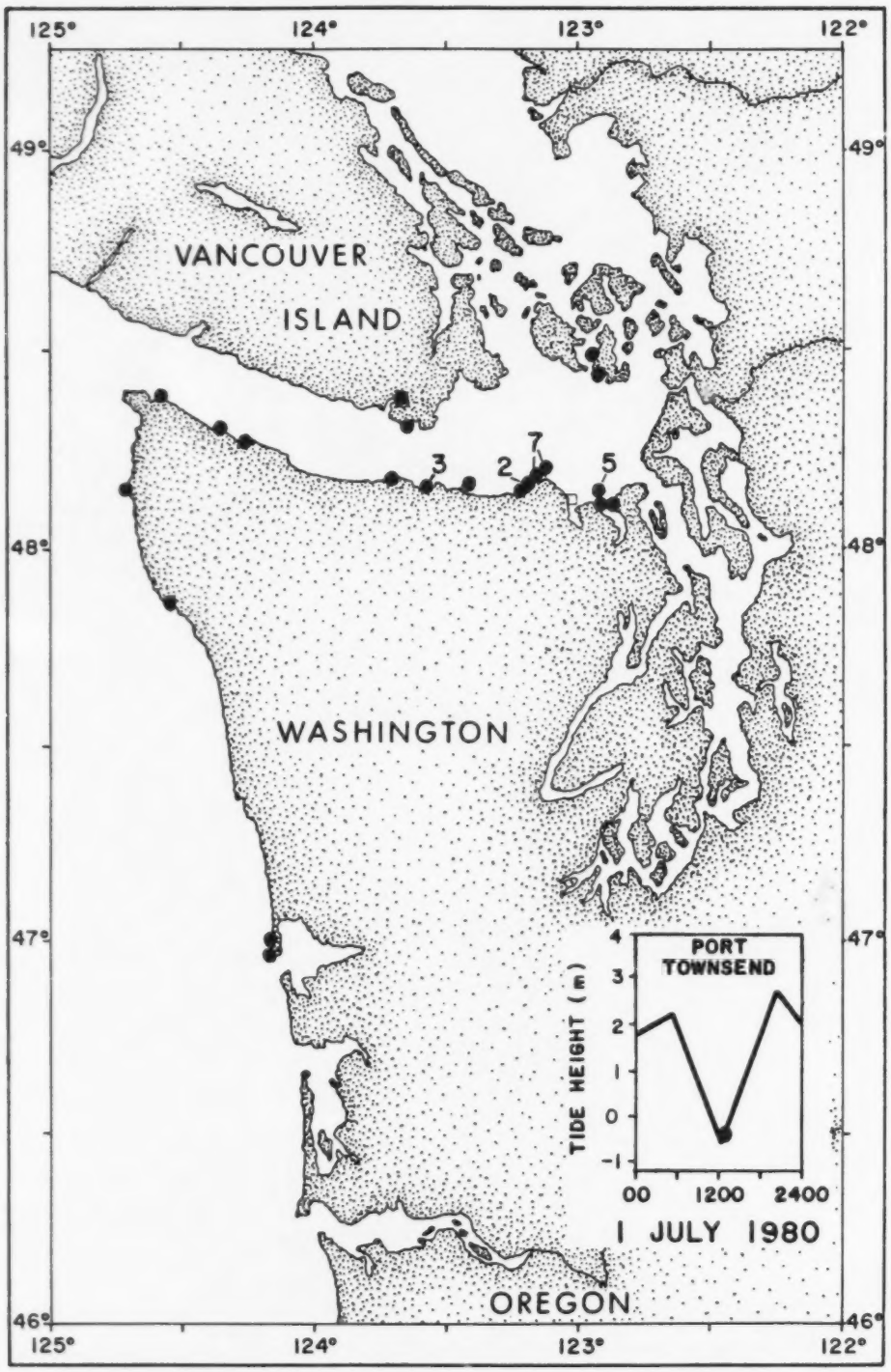
Appendix A.13. Recovery positions of drift cards numbered 12100-12199 released at Site 3.



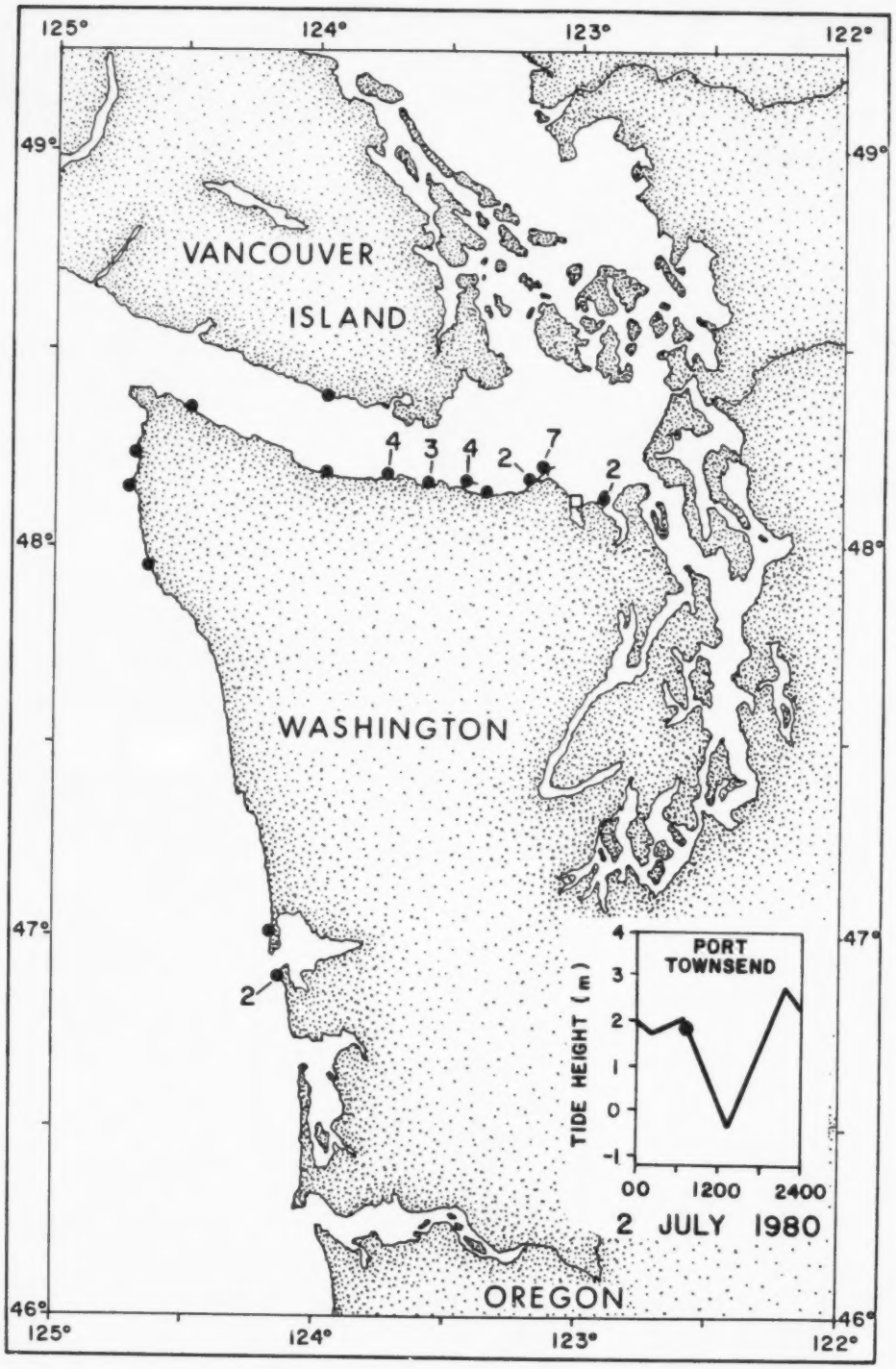
Appendix A.14. Recovery positions of drift cards numbered 10000-10099 released at Site 4.



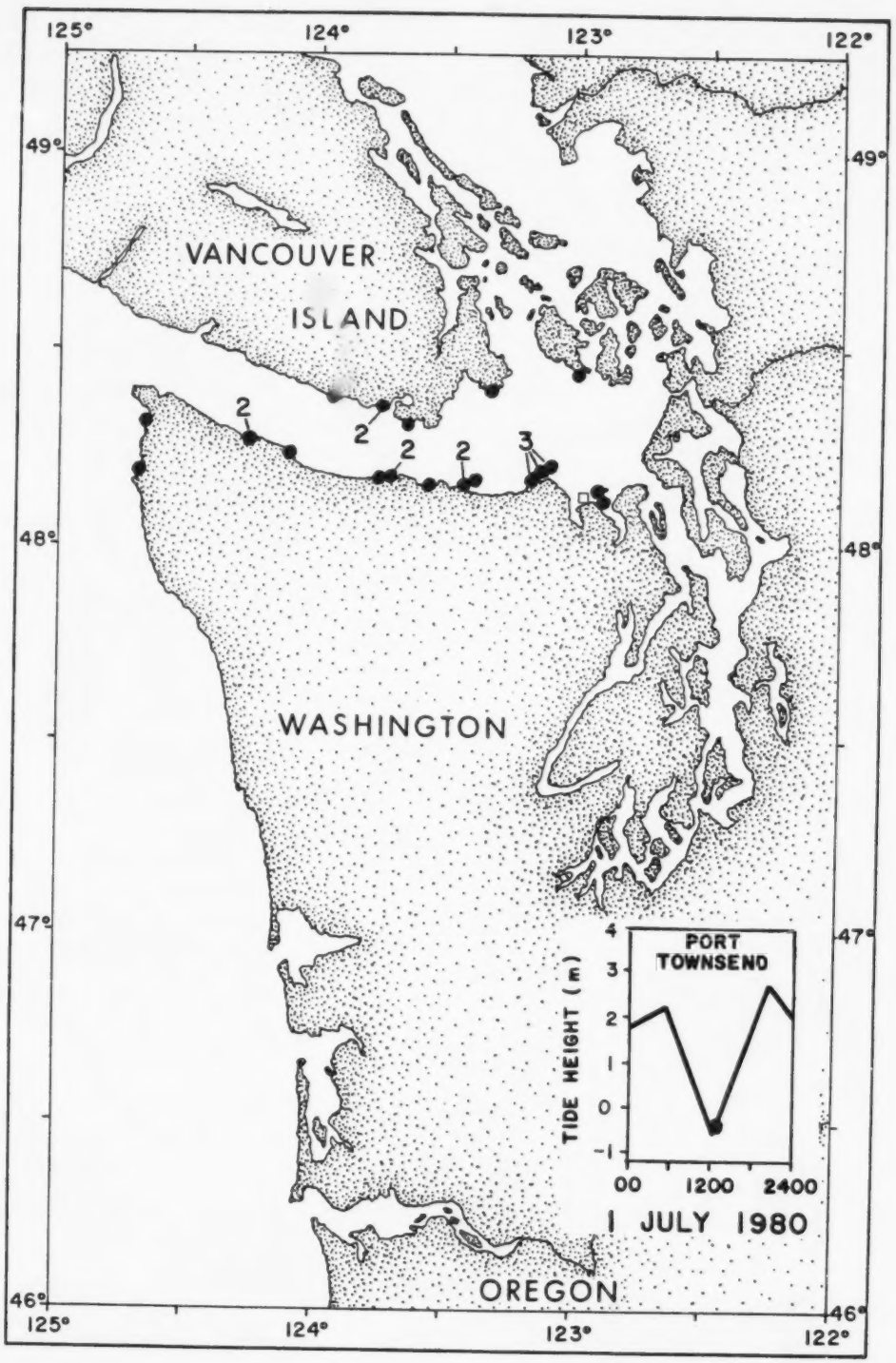
Appendix A.15. Recovery positions of drift cards numbered 12000-12099 released at Site 4.



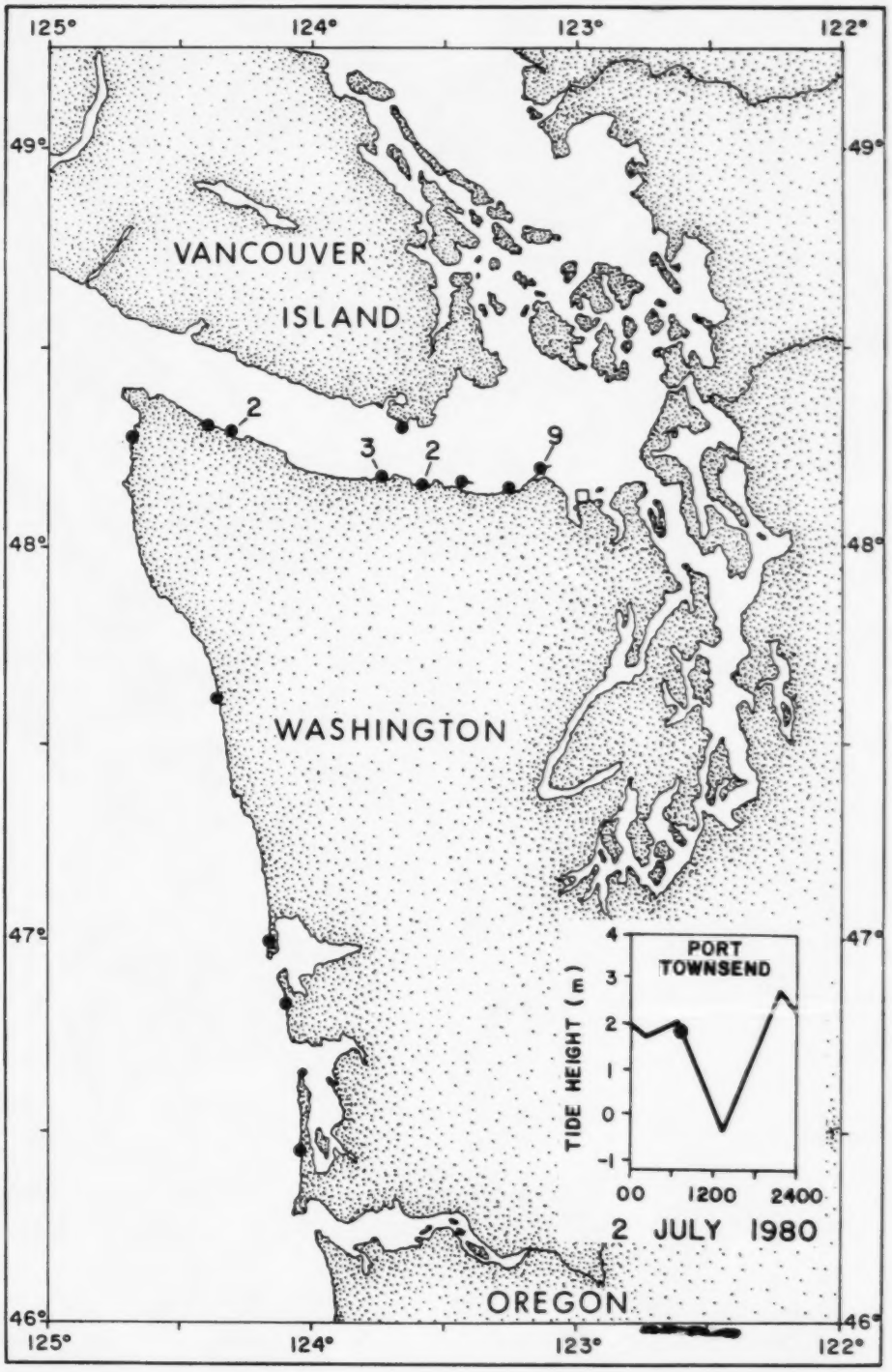
Appendix A.16. Recovery positions of drift cards numbered 10400-10499 released at Site 5.



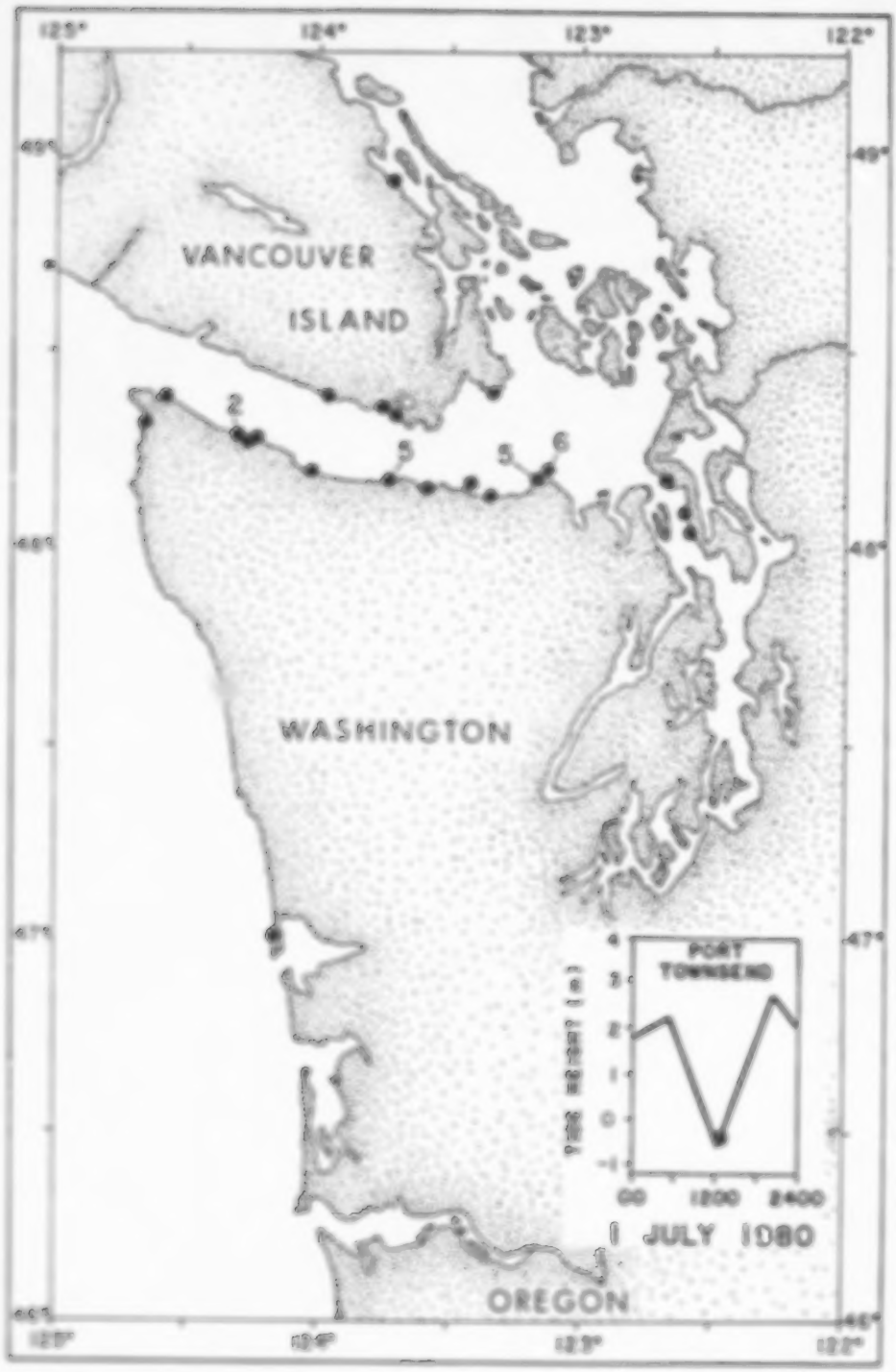
Appendix A.17. Recovery positions of drift cards numbered 12400-12499 released at Site 5.



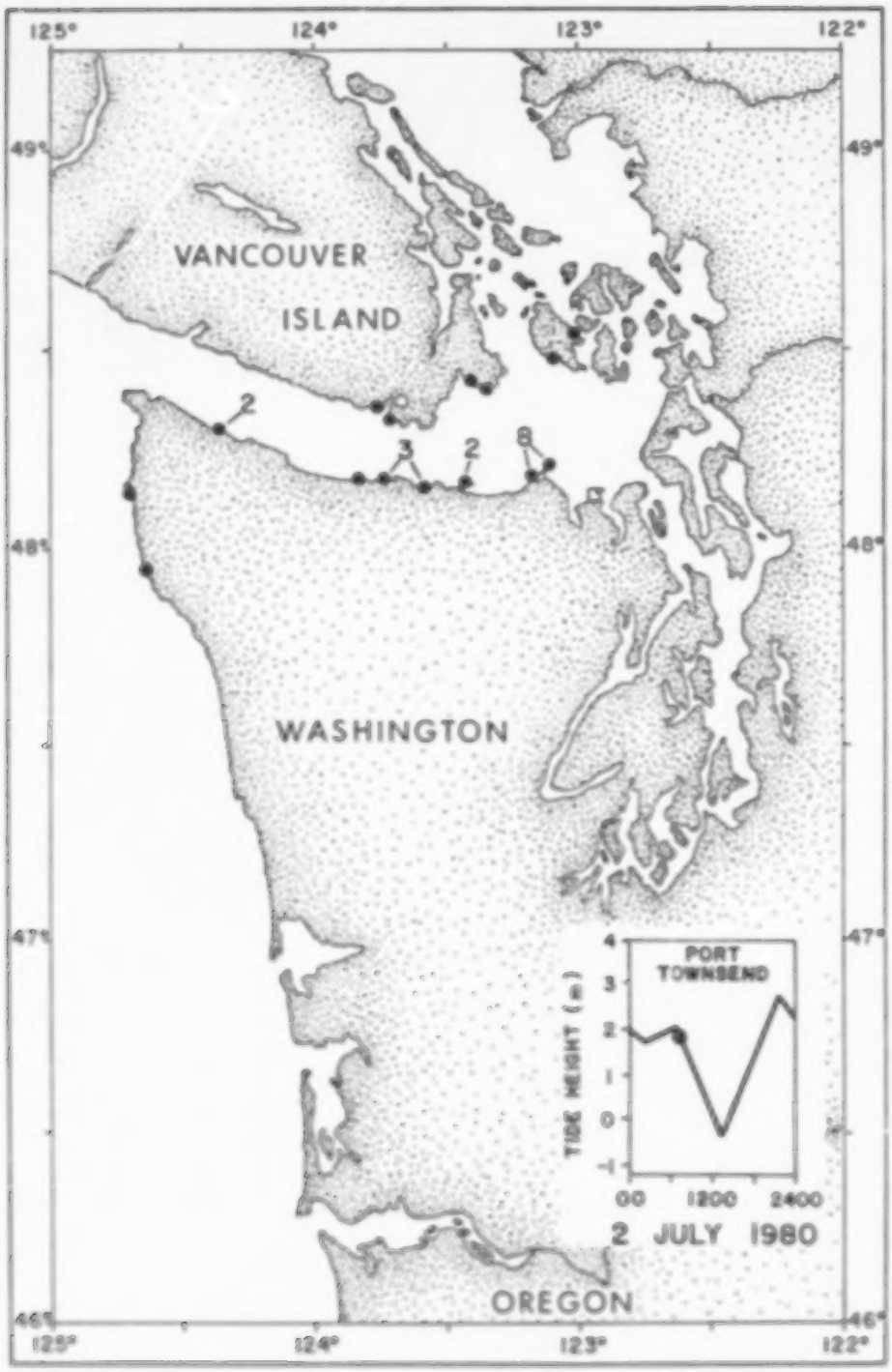
Appendix A.18. Recovery positions of drift cards numbered 10500-10599 released at Site 6.



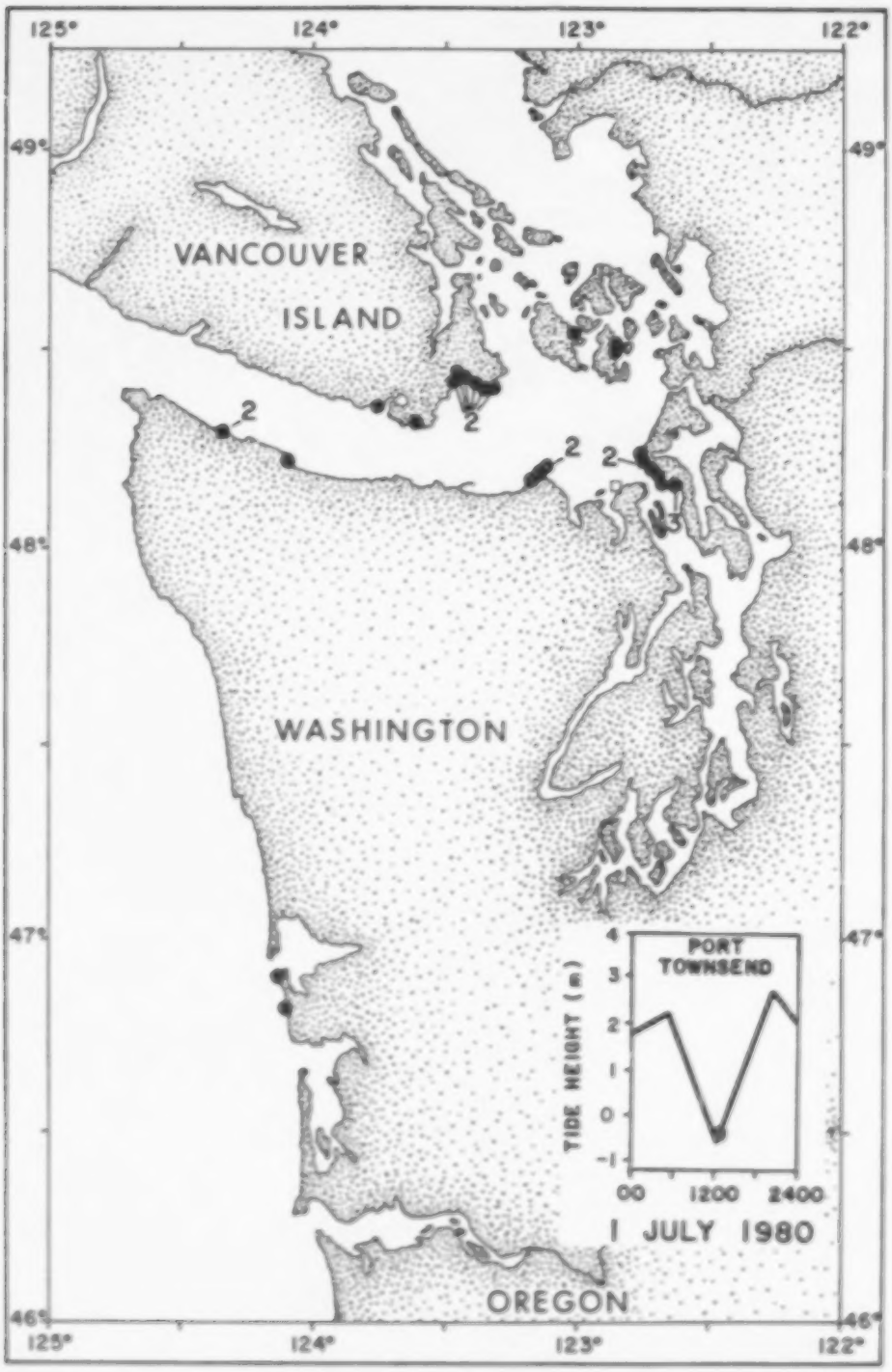
Appendix A.19. Recovery positions of drift cards numbered 12500-12599 released at Site 6.



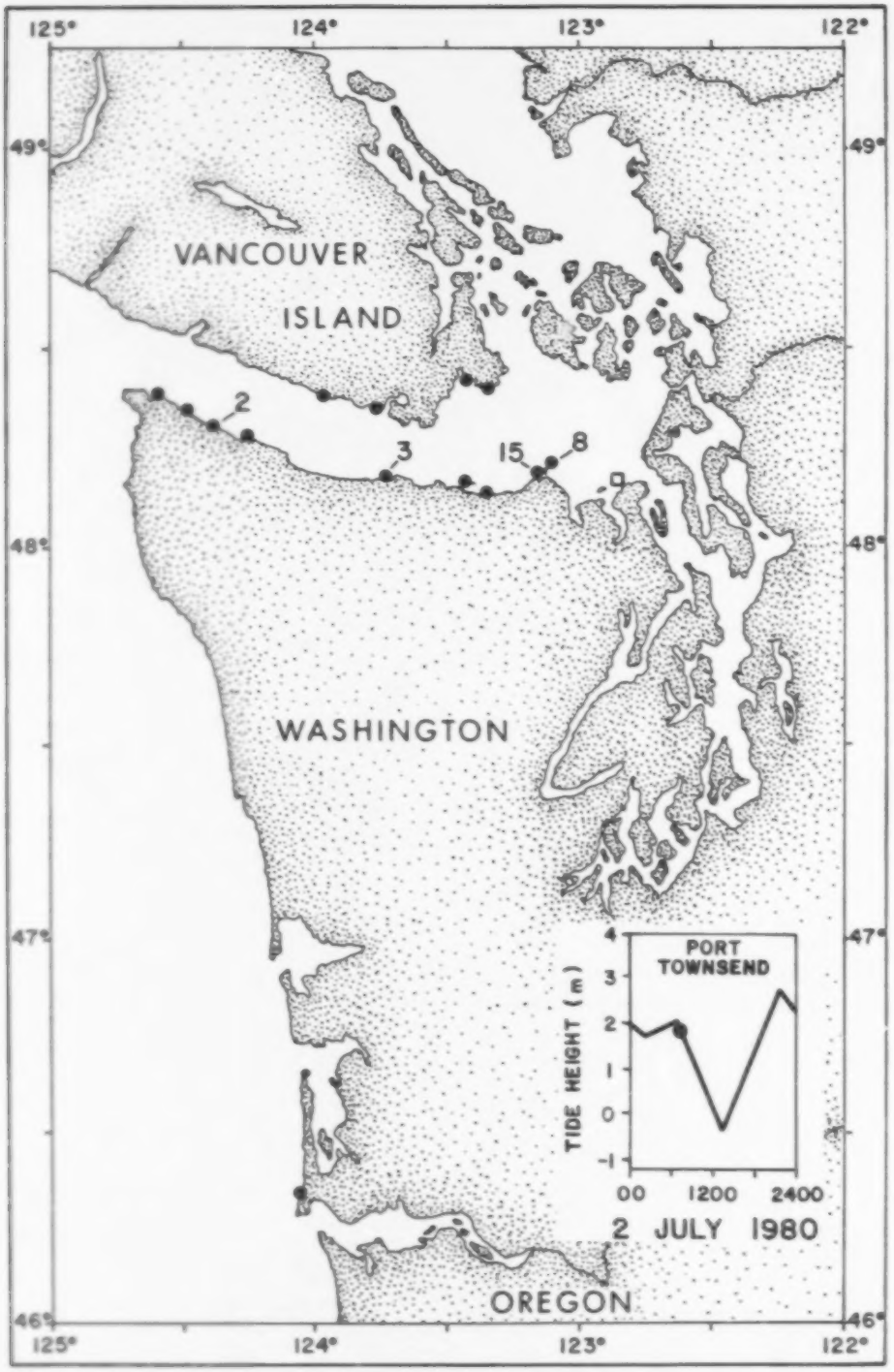
Appendix A.21. Recovery positions of drift cards numbered 33601-33699 released at Site 7.



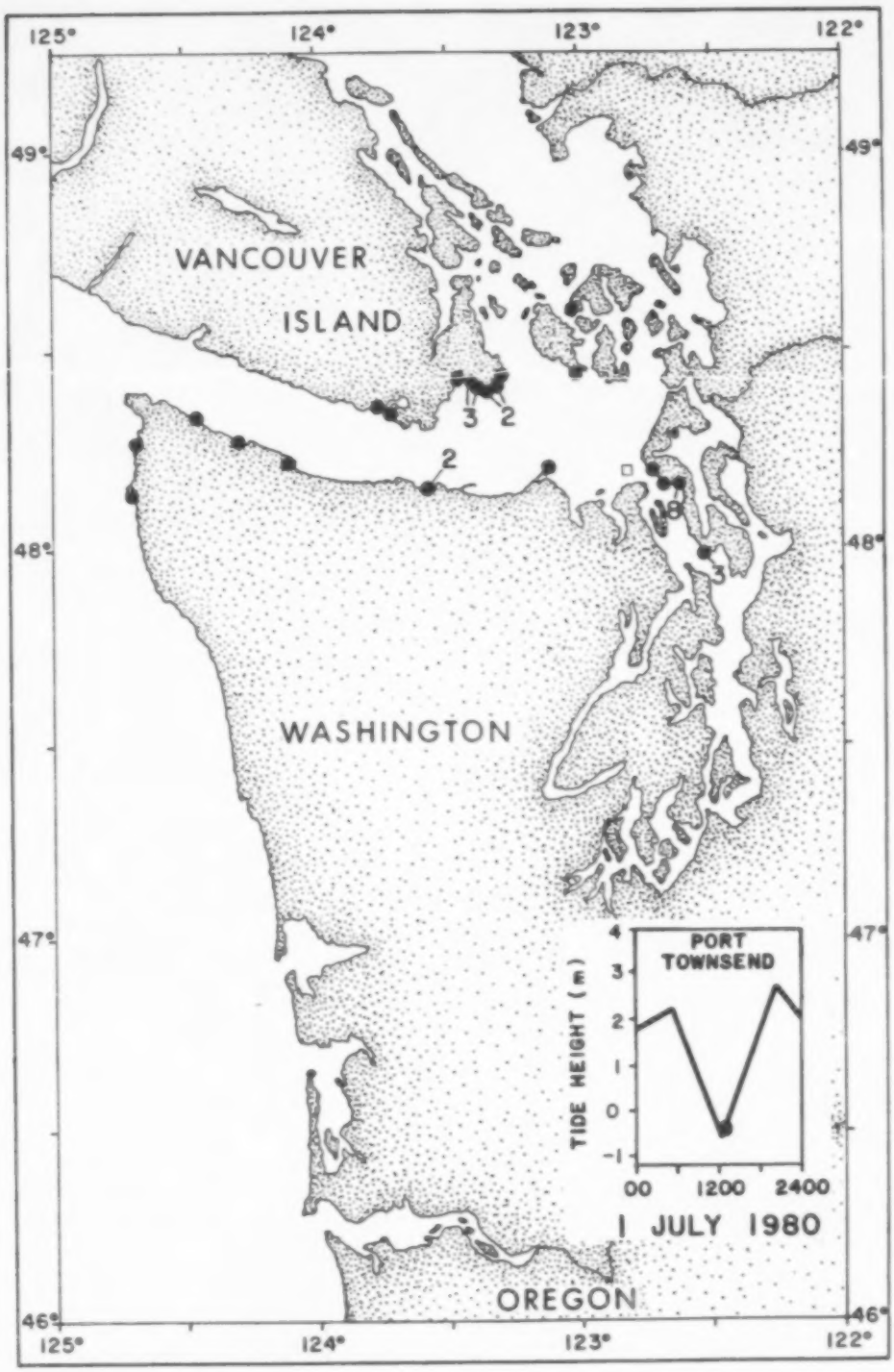
Appendix A.21. Recovery positions of drift cards numbered 12600-12699 released at Site 7.



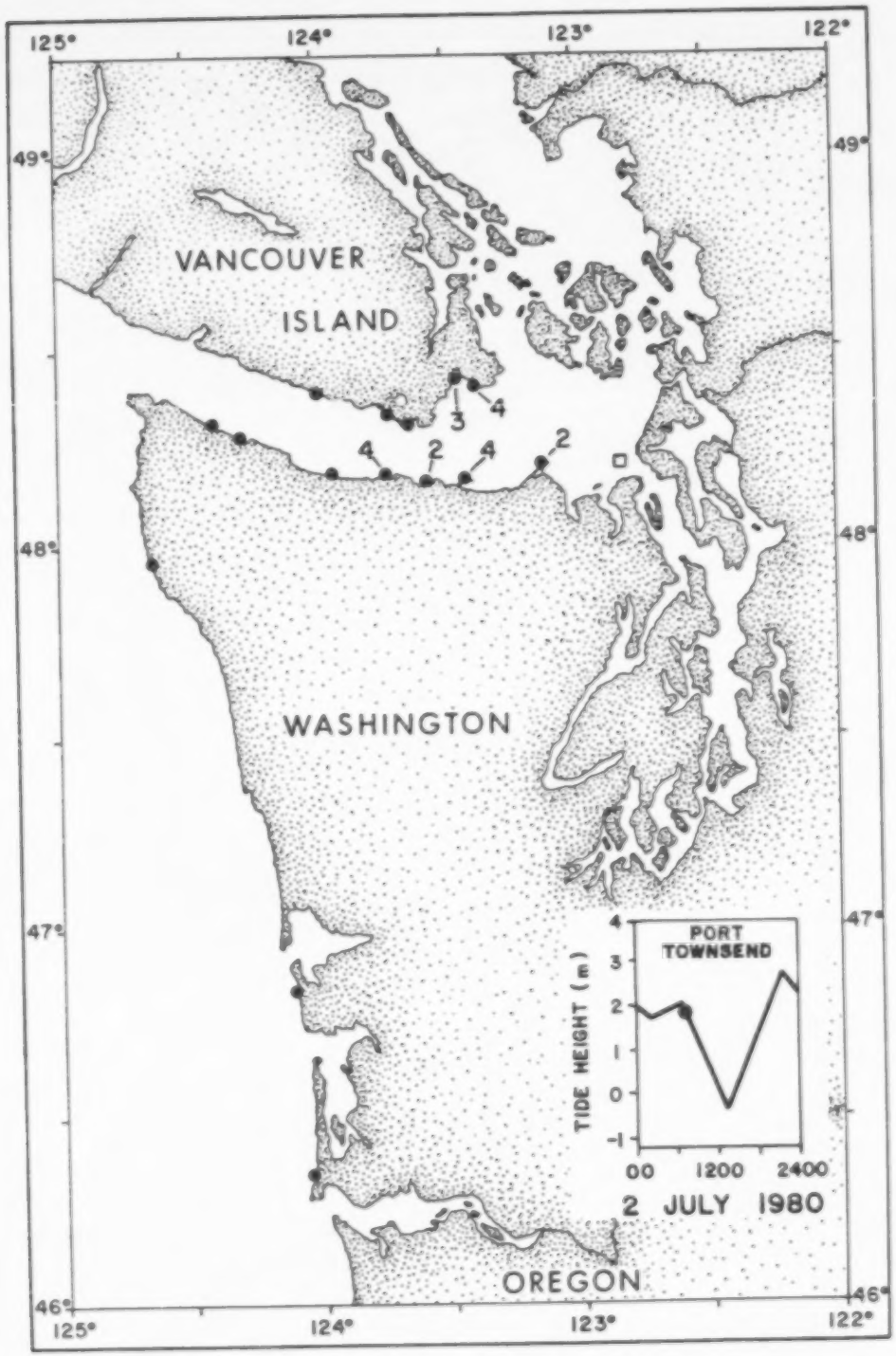
Appendix A.22. Recovery positions of drift cards numbered 10700-10799 released at Site 8.



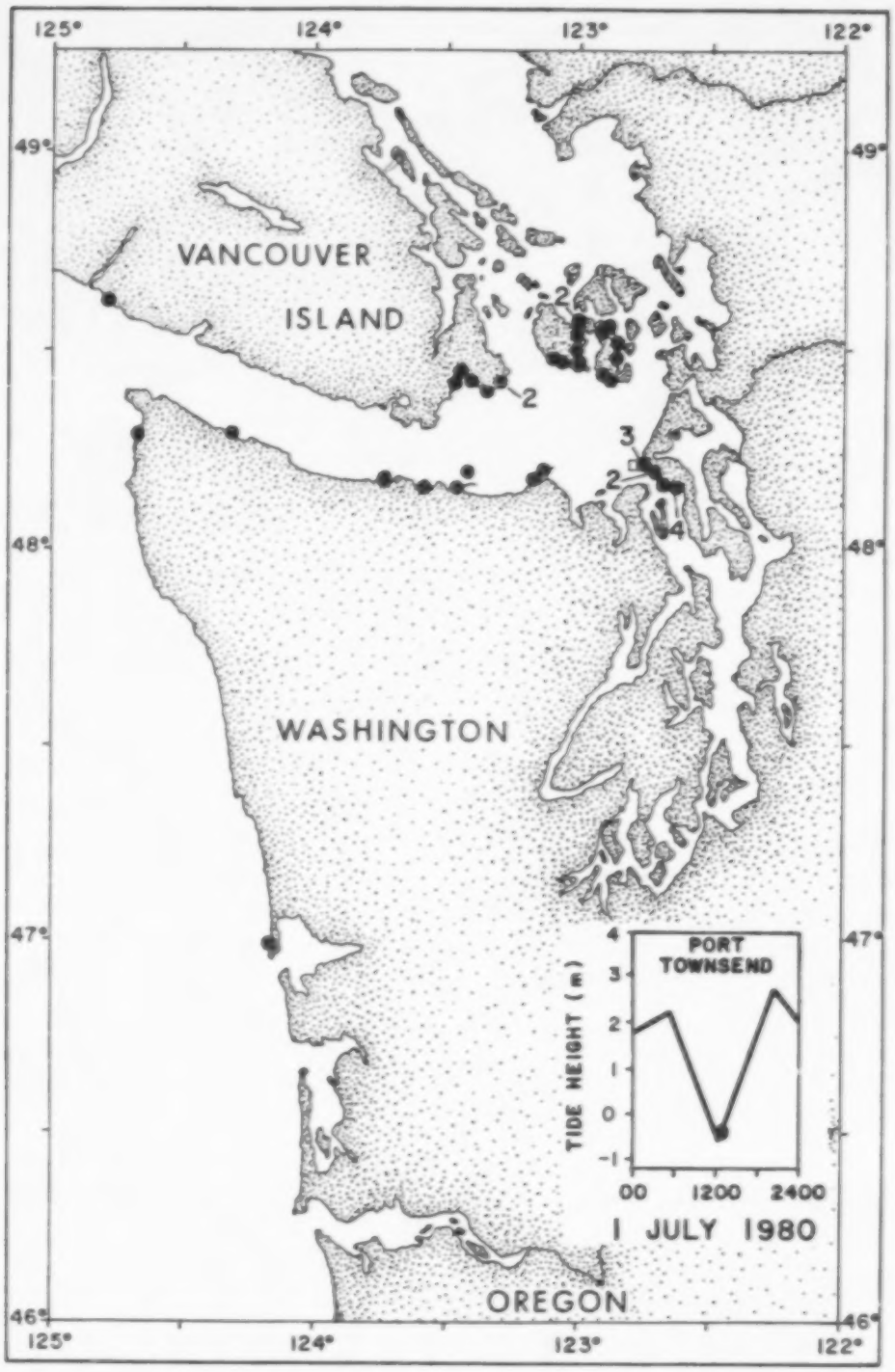
Appendix A.23. Recovery positions of drift cards numbered 12700-12799 released at Site 8.



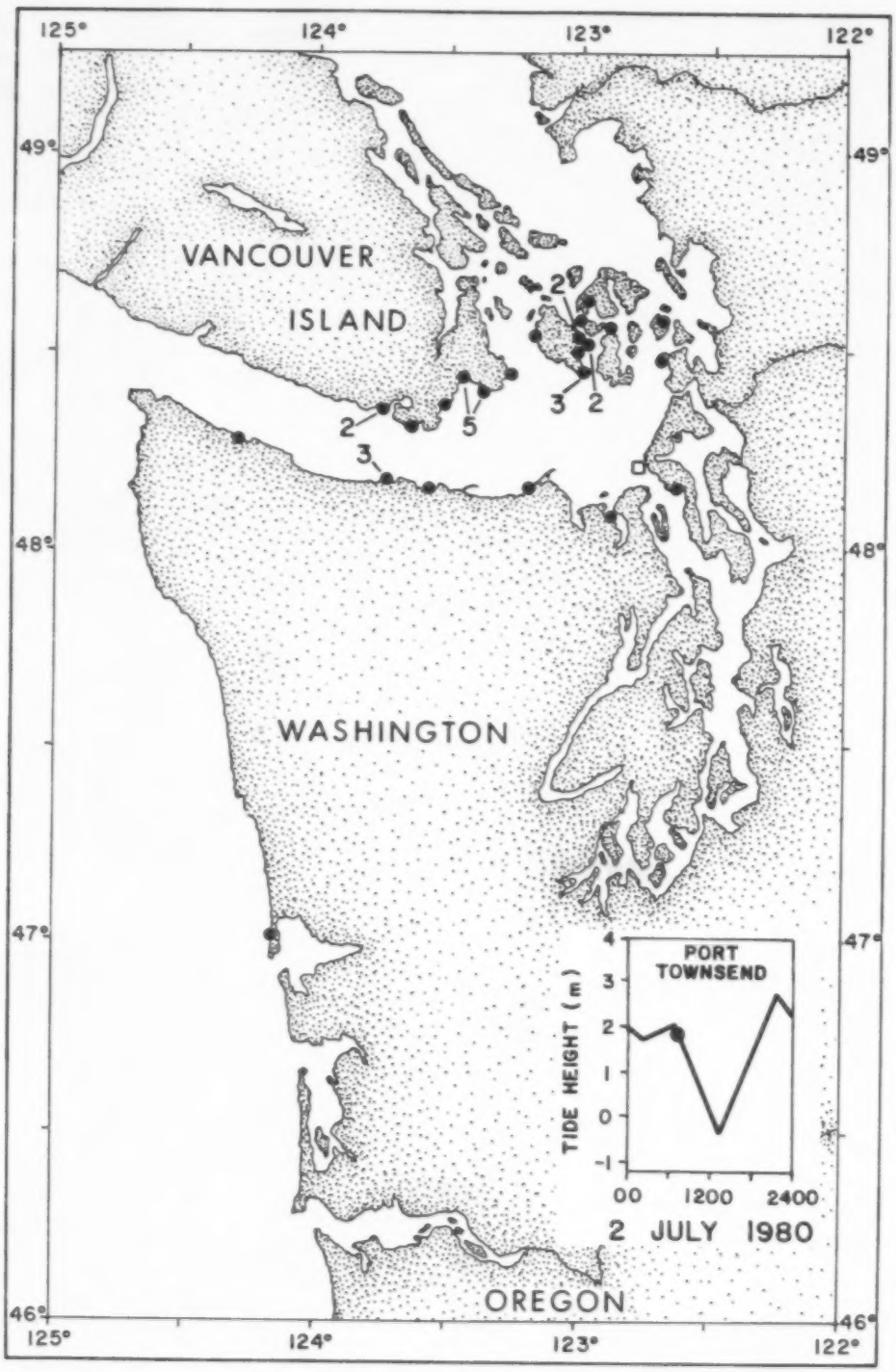
Appendix A.24. Recovery positions of drift cards numbered 10800-10899 released at Site 9.



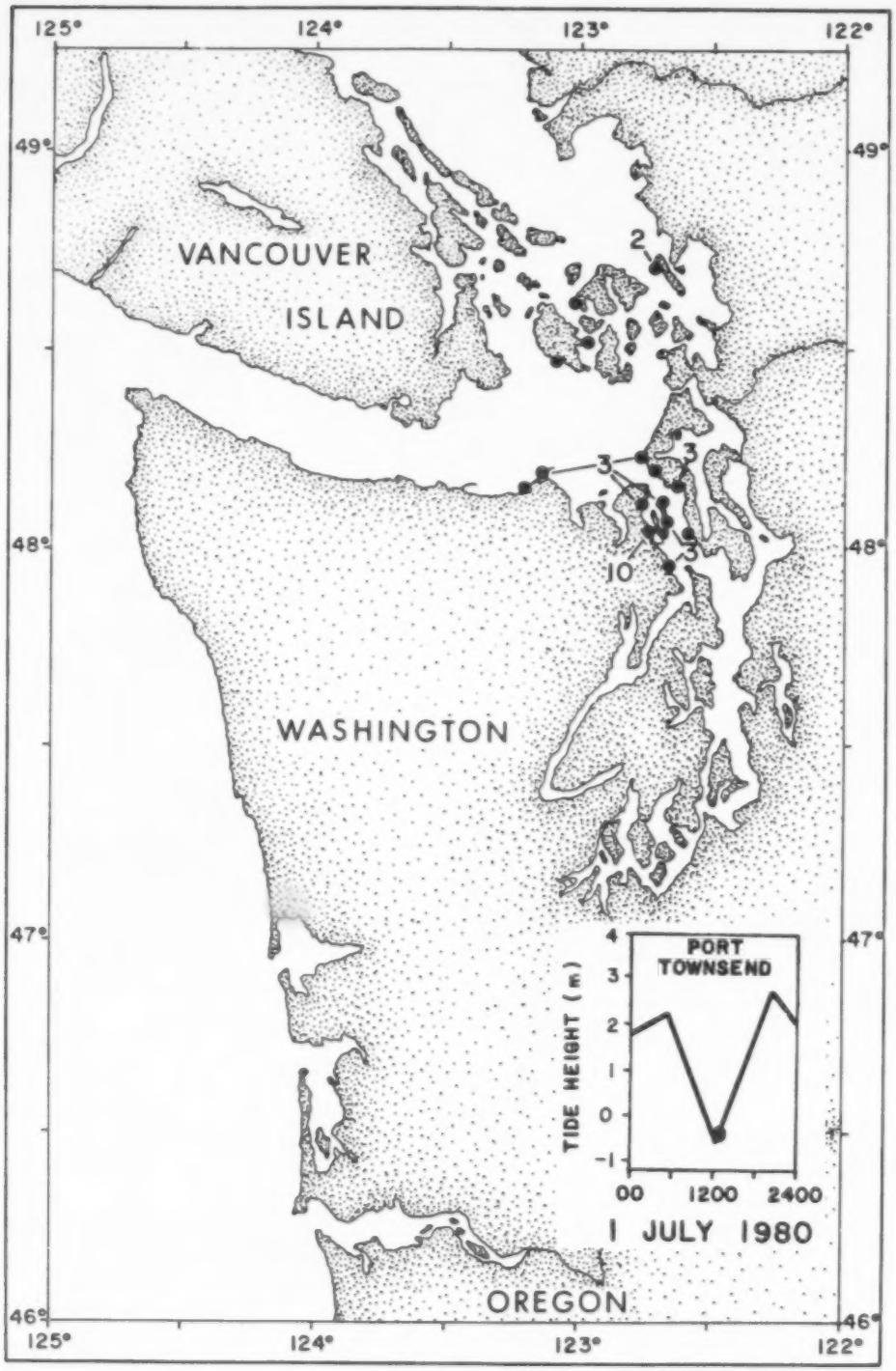
Appendix A.25. Recovery positions of drift cards numbered 12800-12899 released at Site 9.



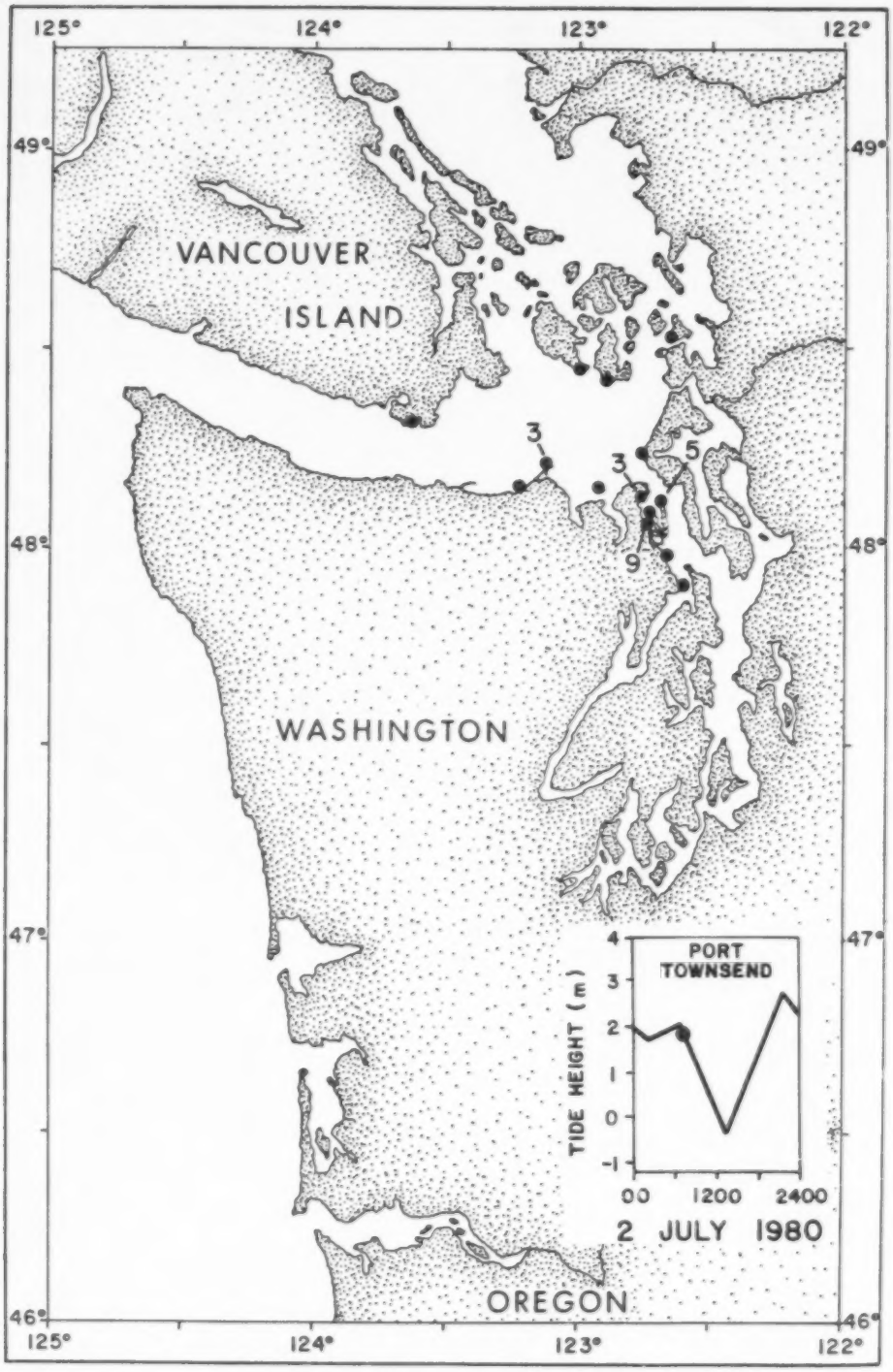
Appendix A.26. Recovery positions of drift cards numbered 10900-10999 released at Site 10.



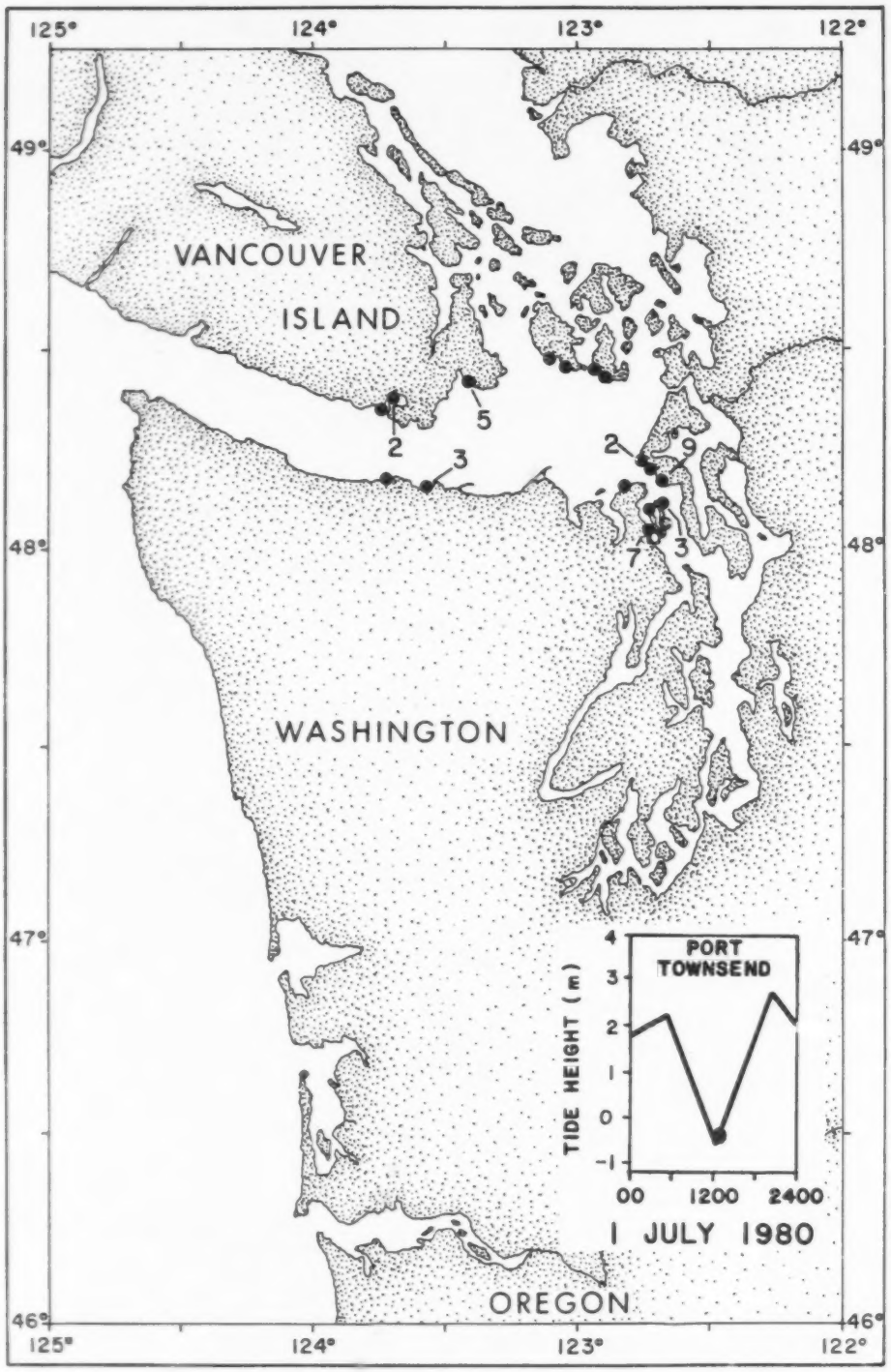
Appendix A.27. Recovery positions of drift cards numbered 12900-12999 released at Site 10.



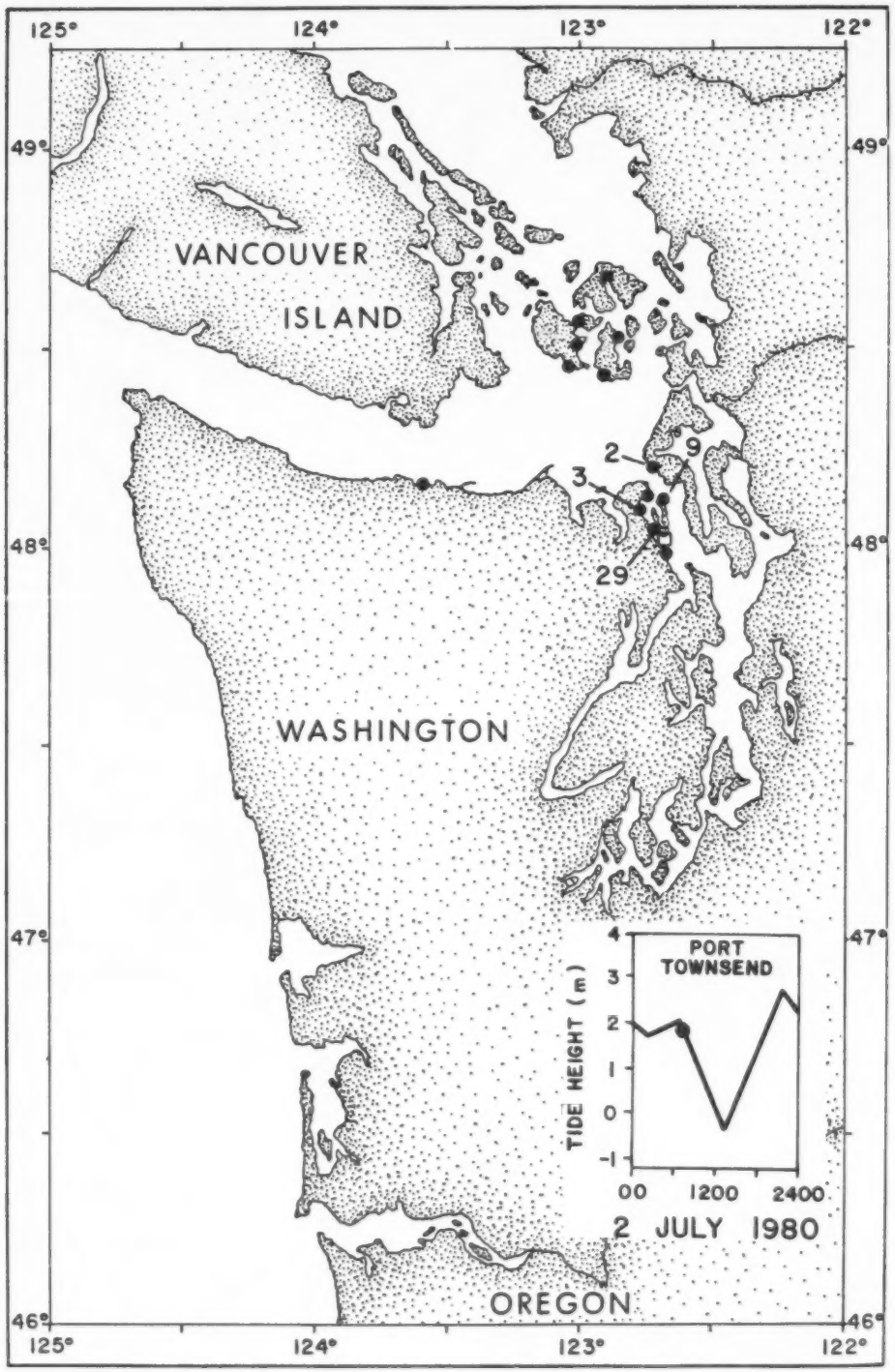
Appendix A.28. Recovery positions of drift cards numbered 11000-11099 released at Site 11.



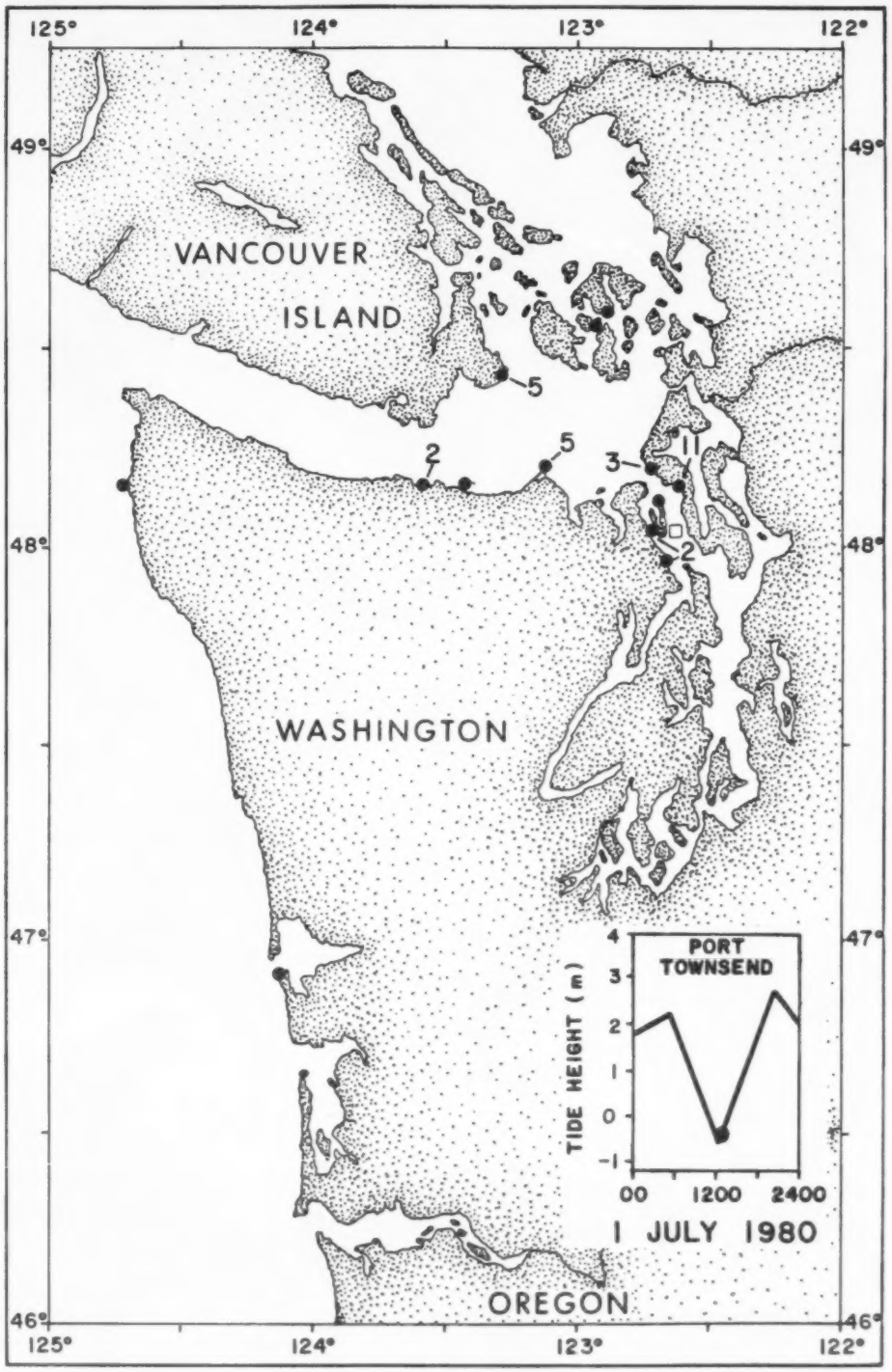
Appendix A.29. Recovery positions of drift cards numbered 13000-13099 released at Site 11.



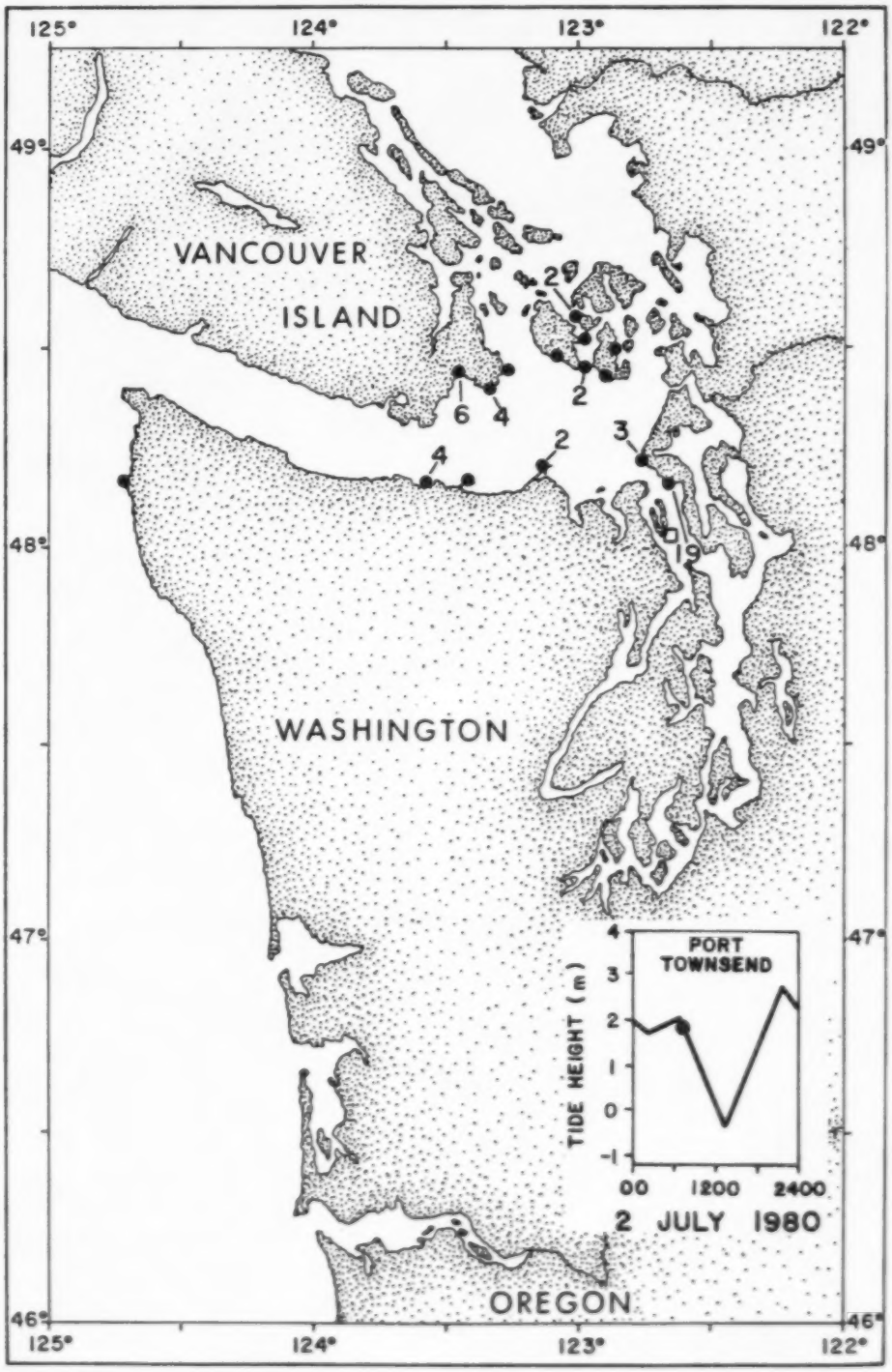
Appendix A.30. Recovery positions of drift cards numbered 11100-11199 released at Site 12.



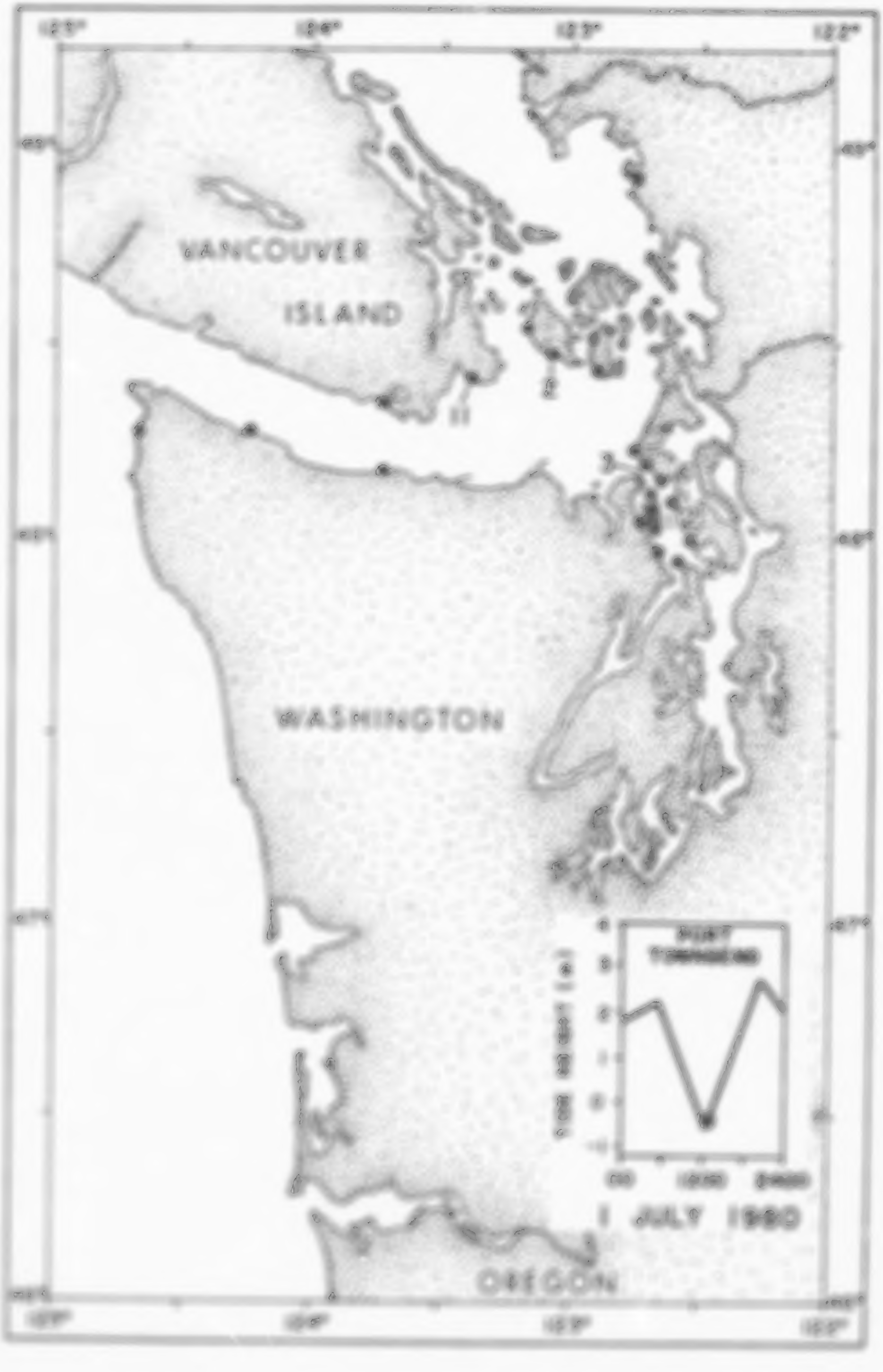
Appendix A.31. Recovery positions of drift cards numbered 13100-13199 released at Site 12.



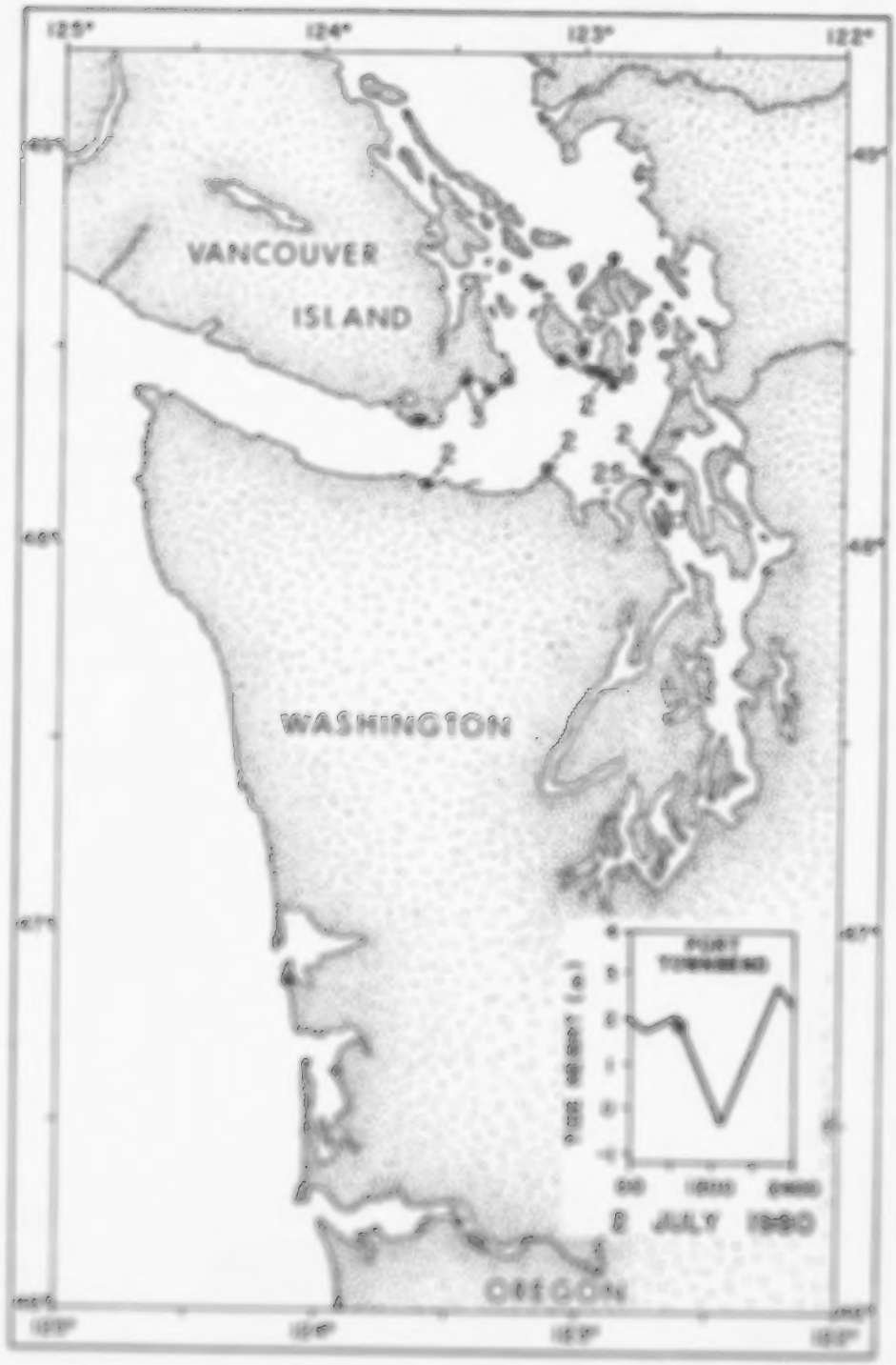
Appendix A.32. Recovery positions of drift cards numbered 11200-11299 released at Site 13.



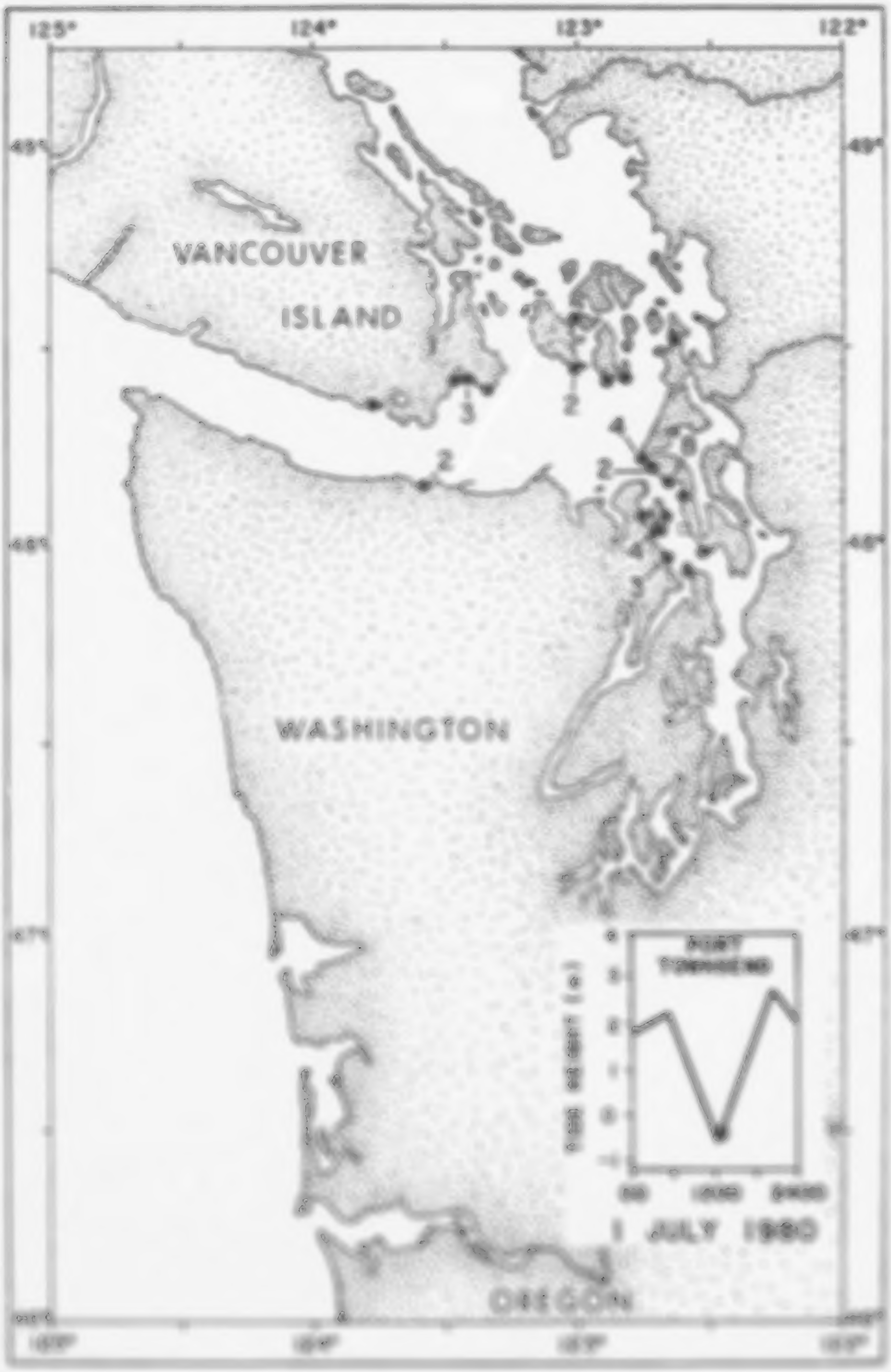
Appendix A.33. Recovery positions of drift cards numbered 13200-13299 released at Site 13.



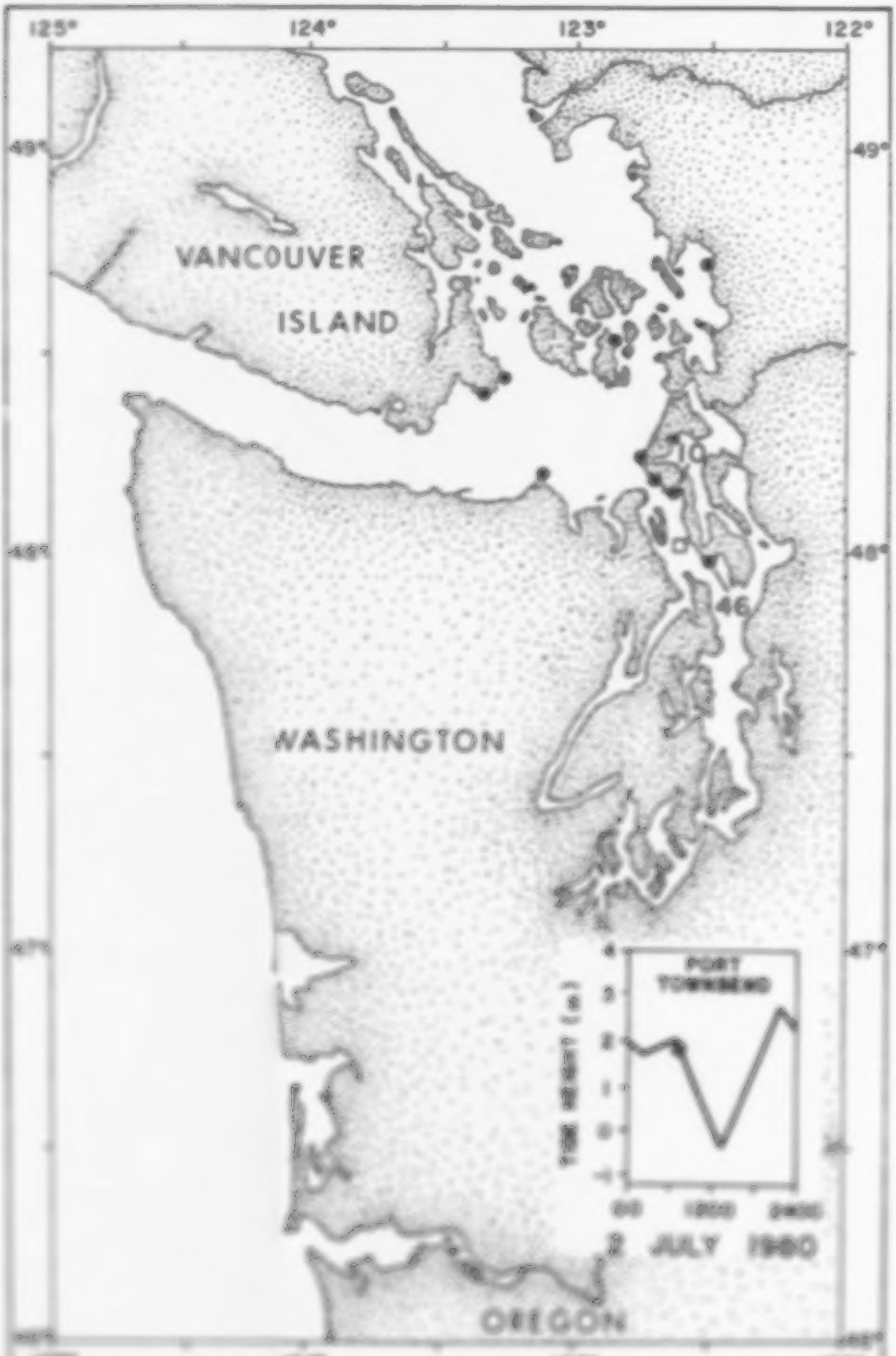
Appendix A [illegible]. Recovery positions of drift cards numbered [illegible] released at Site [illegible].



Appendix A.[illegible]. Recovery positions of [illegible] units [illegible] [illegible] released at [illegible].



Appendix A.[illegible]. Recovery positions of drift cards numbered [illegible] released at Site [illegible].



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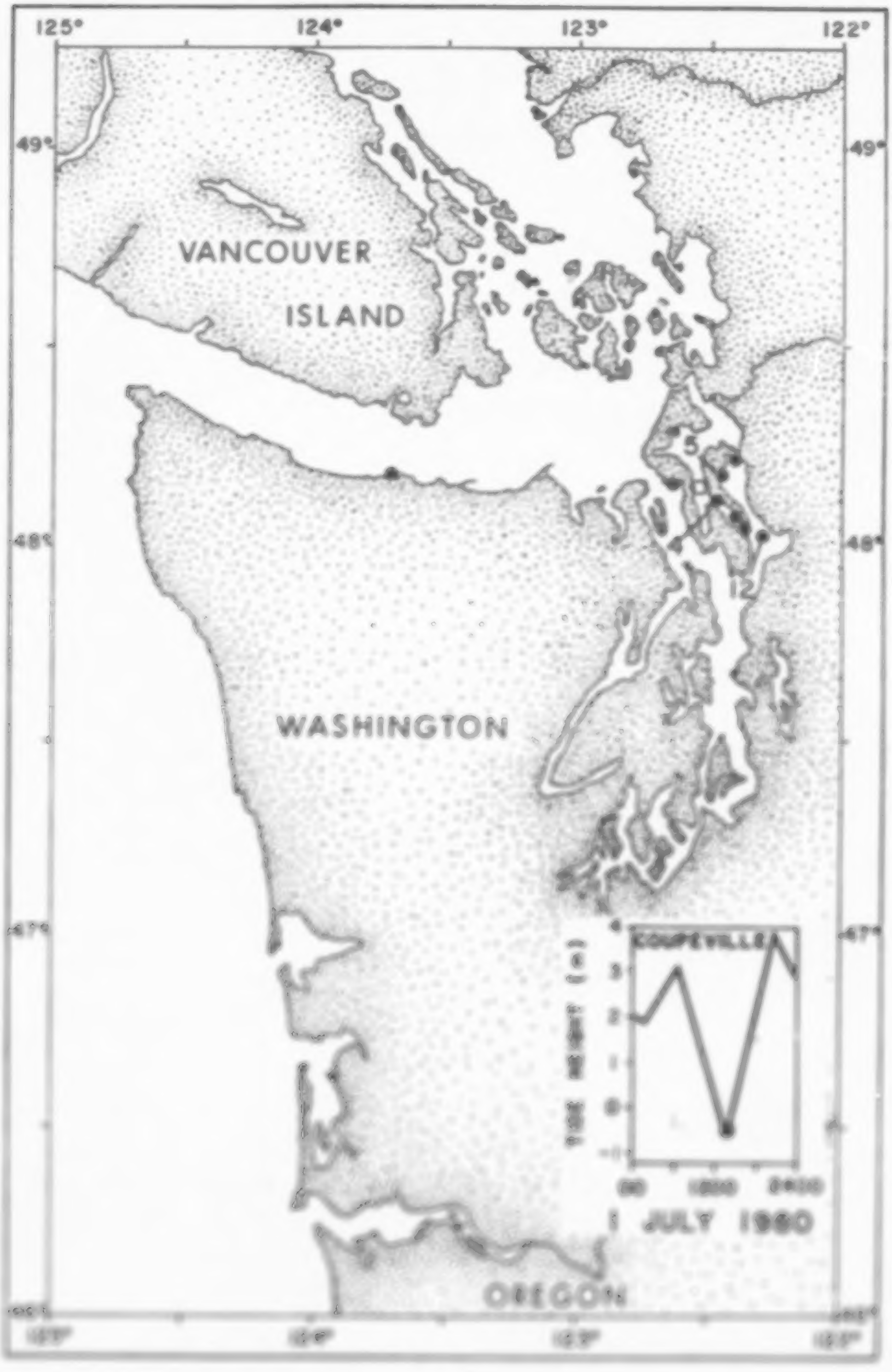
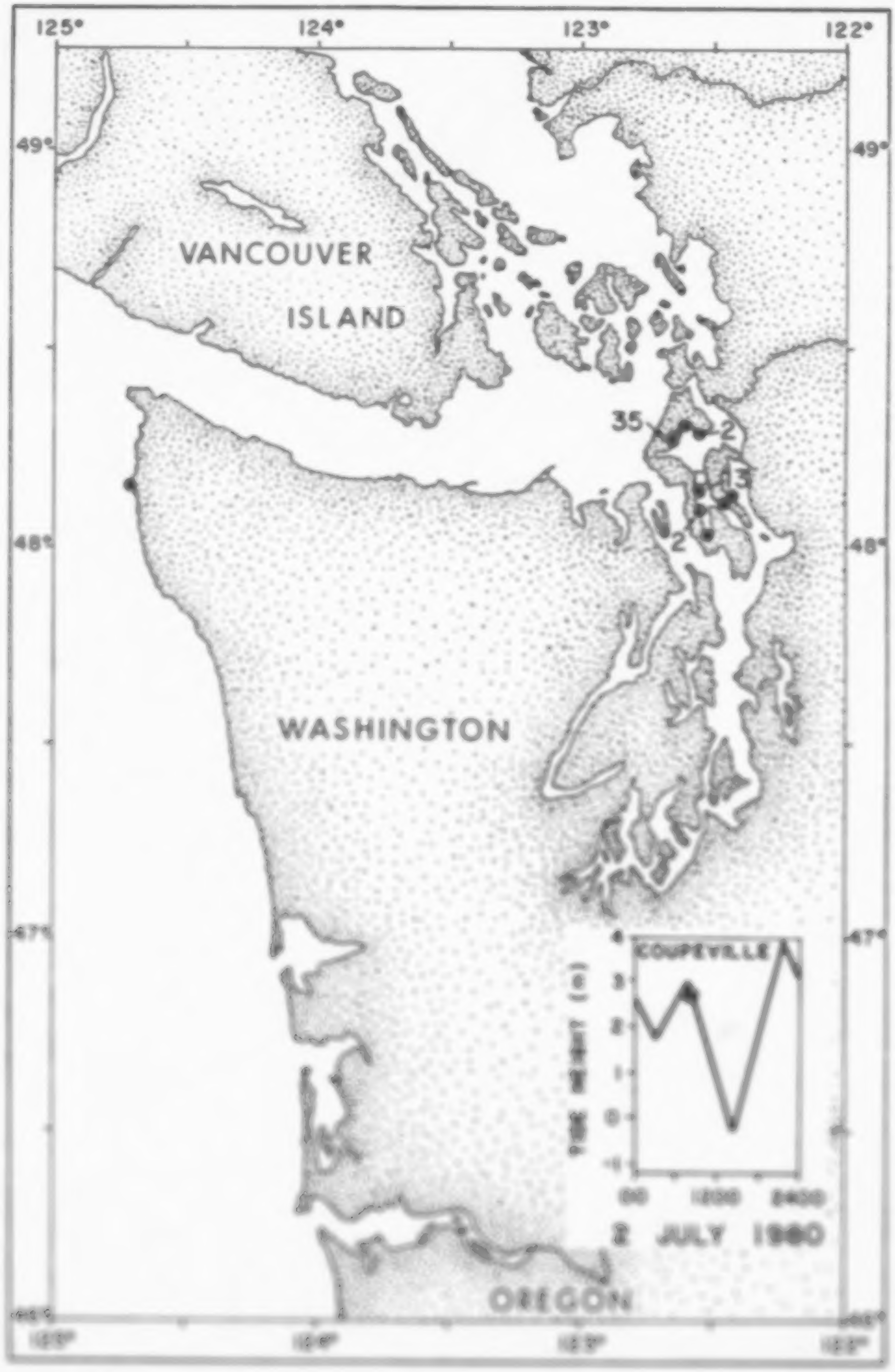


Appendix [illegible]. Recovery positions of drift cards numbered [illegible] released at Site [illegible].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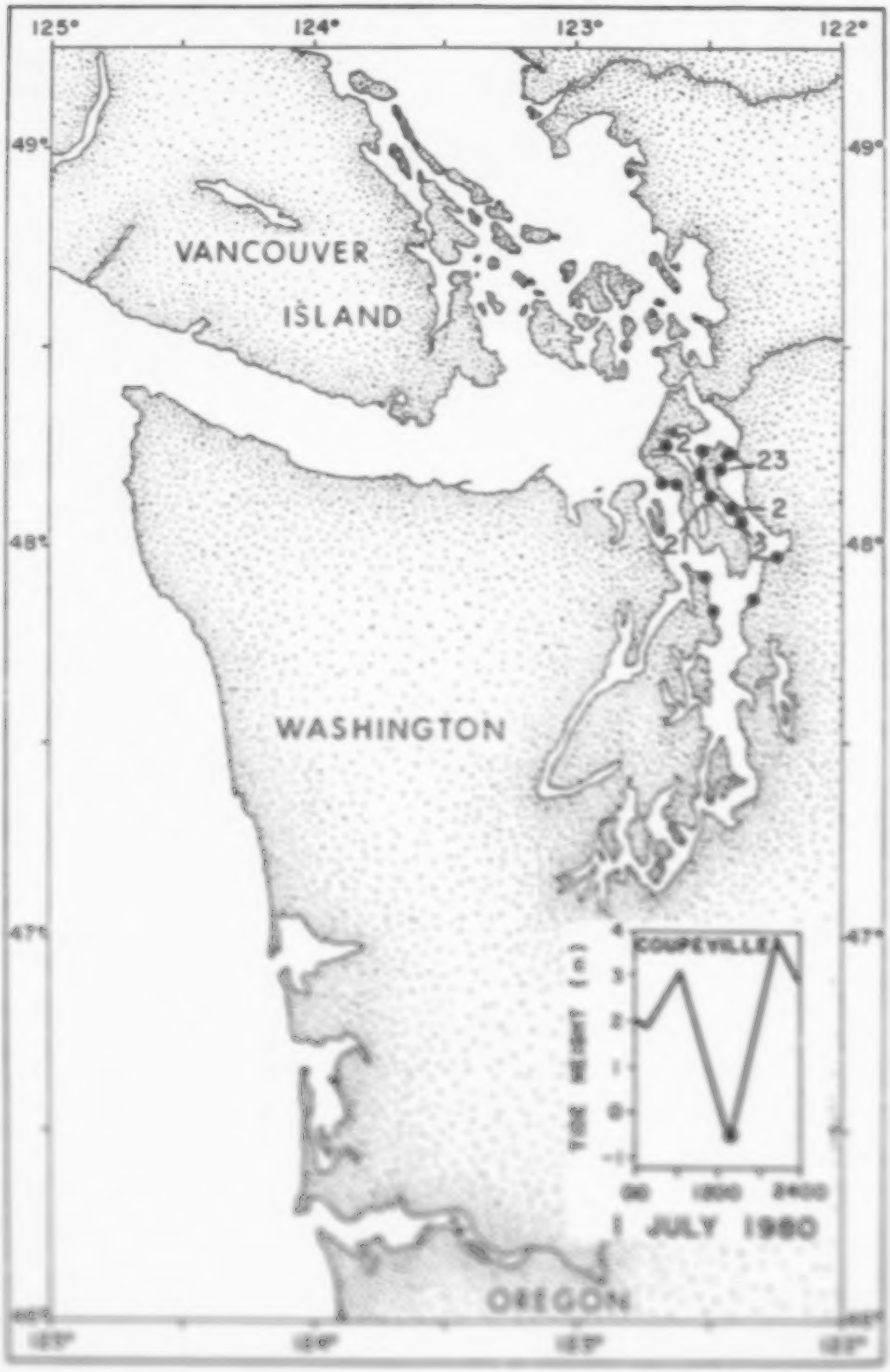
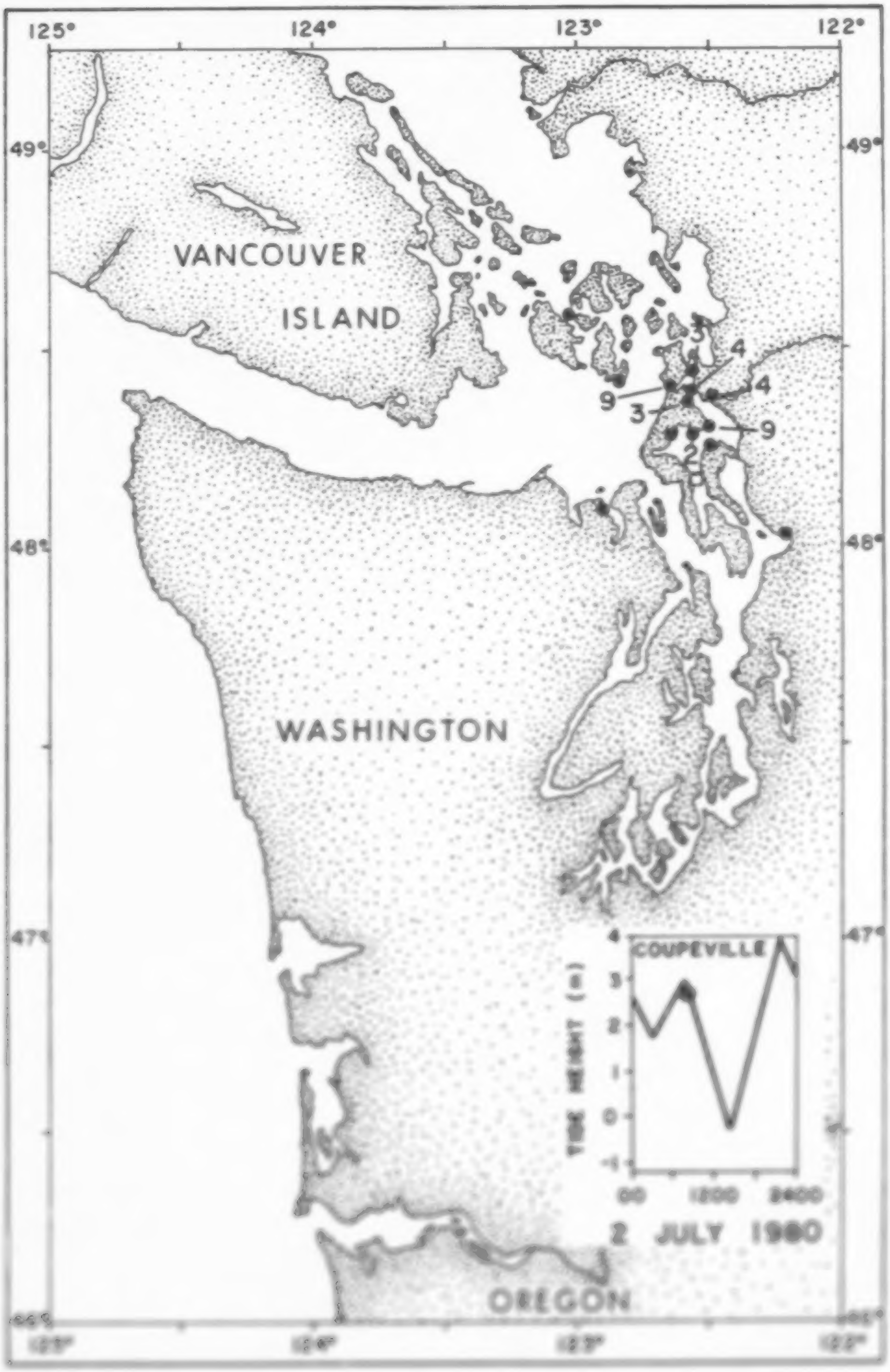
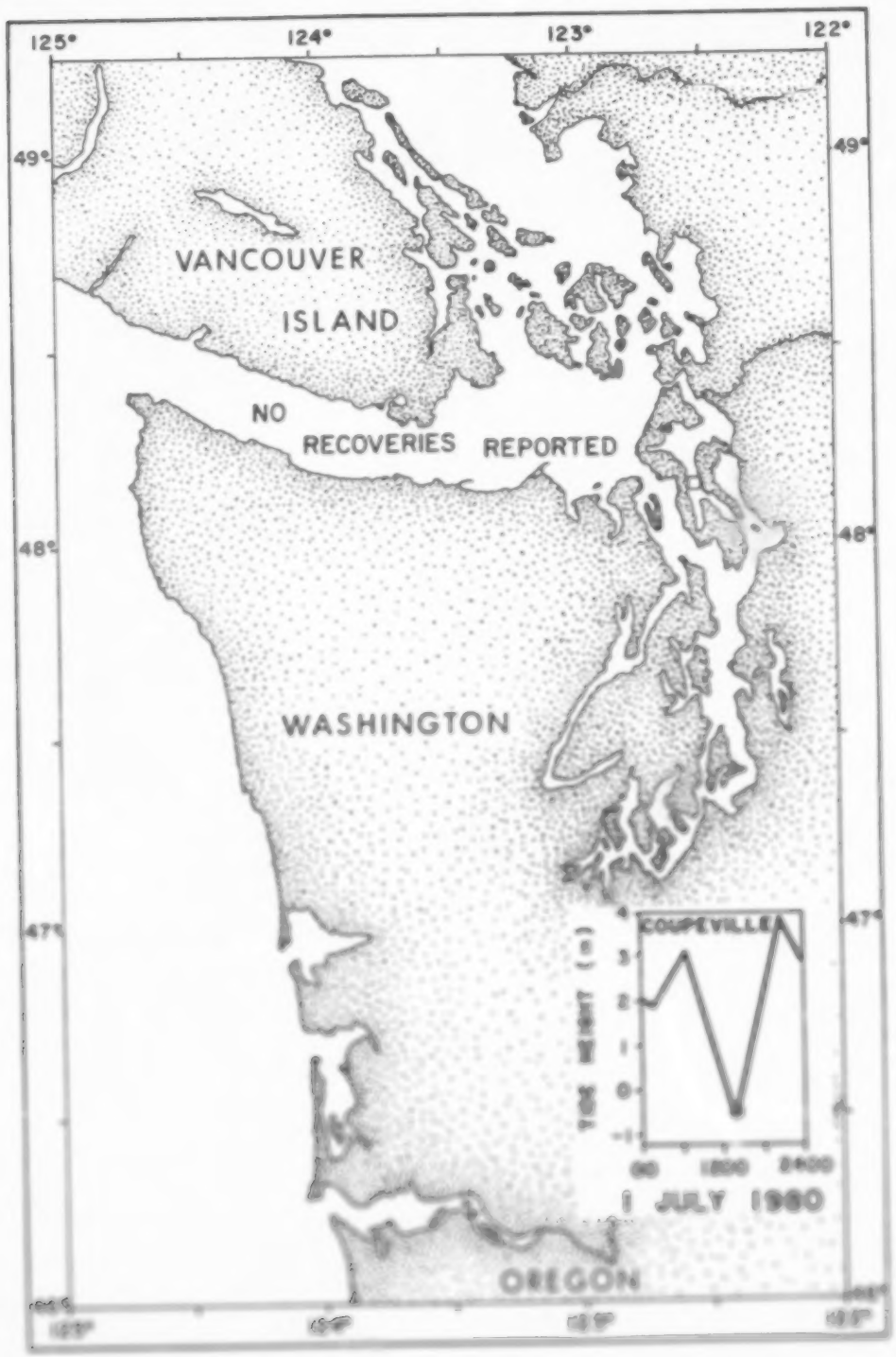


Appendix A.[illegible]. Recovery positions of drift cards numbered [illegible] released at Site 17.



Appendix A.41. Recovery positions of drift cards gathered [illegible] released at Site 17.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RECOVERIES REPORTED
WASHINGTON
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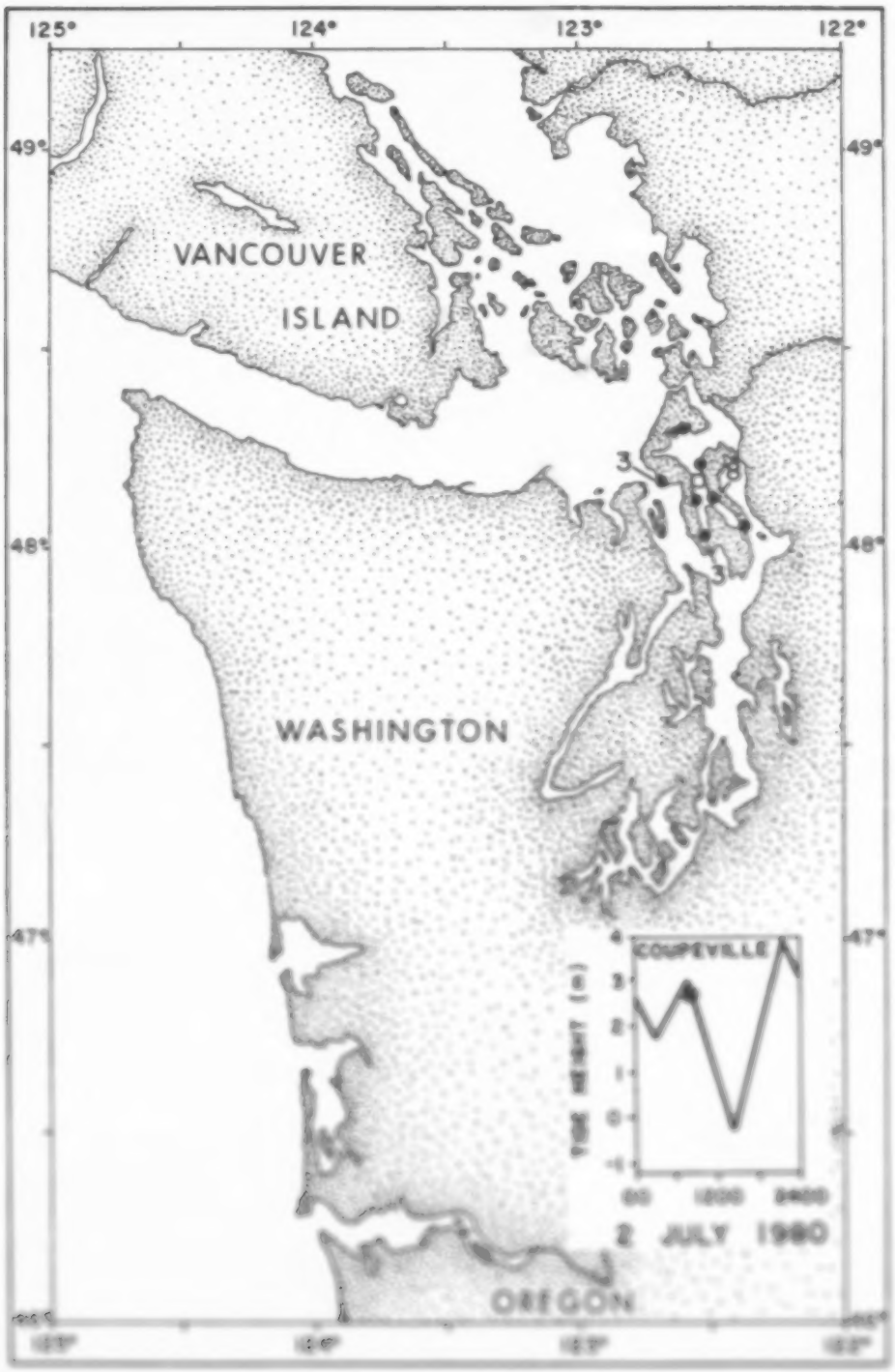
[illegible]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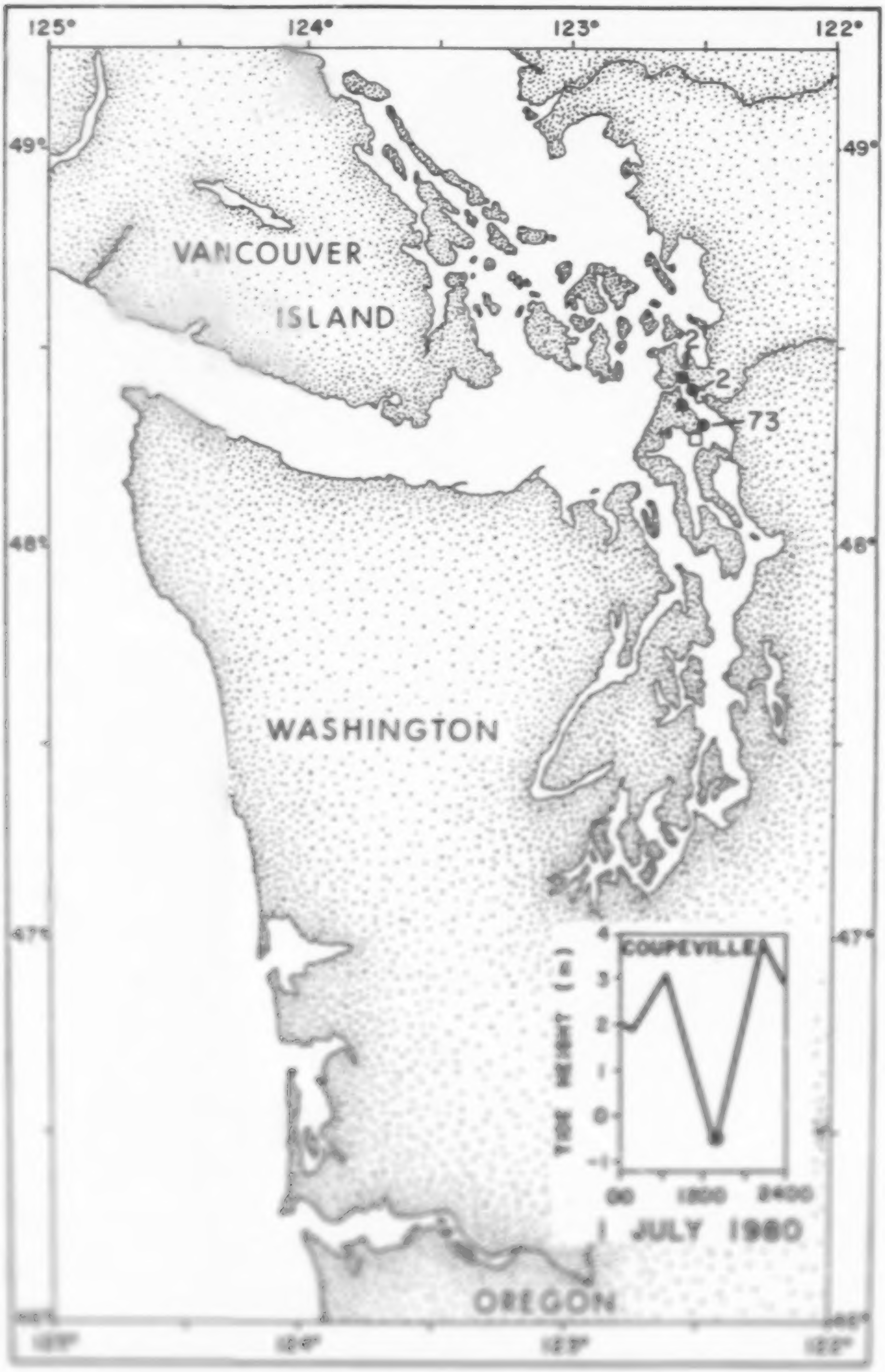
2 JULY 1980

[illegible]



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WASHINGTON
COUPEVILLE
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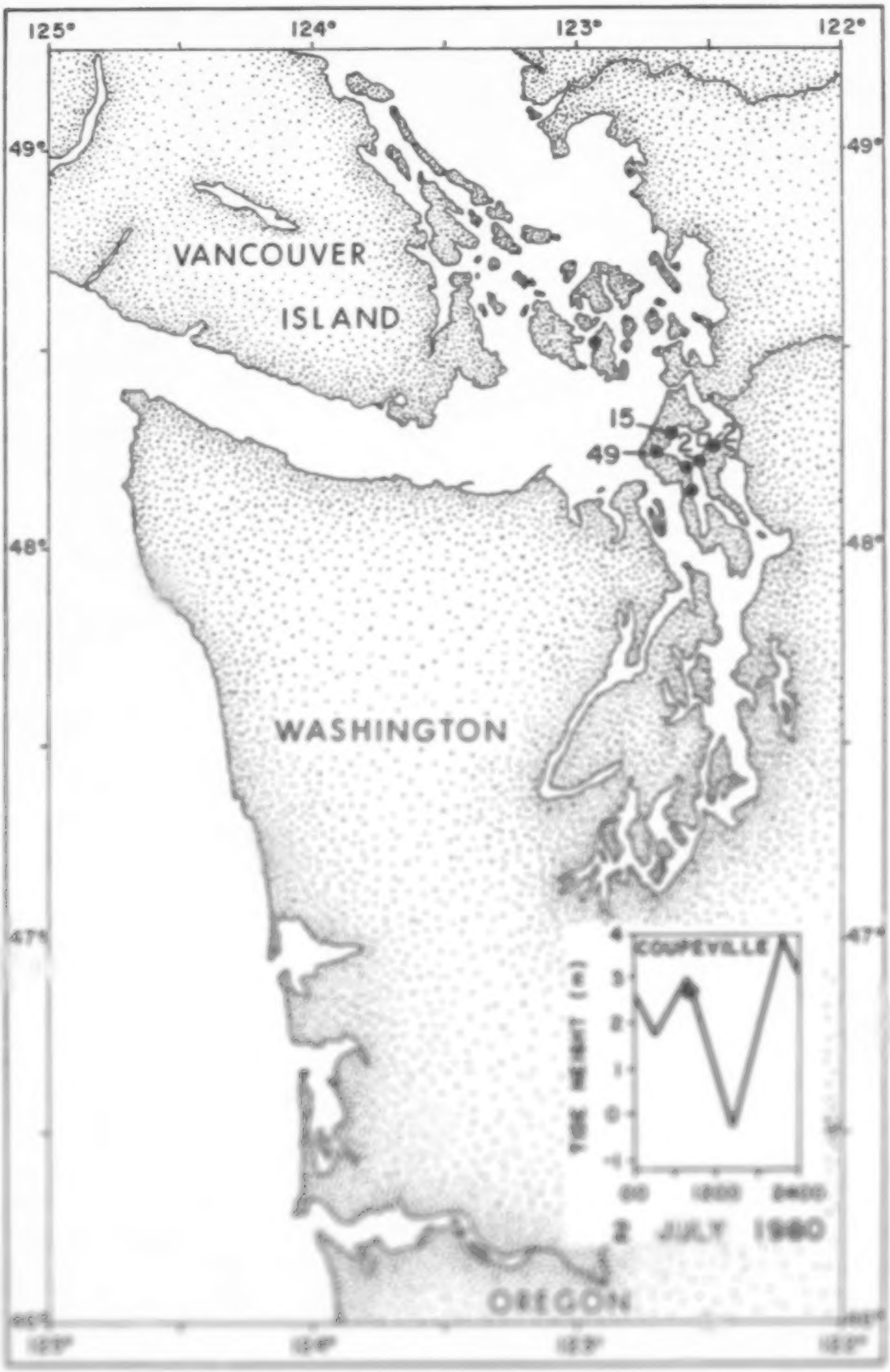
1200
2400
1 JULY 1980
OREGON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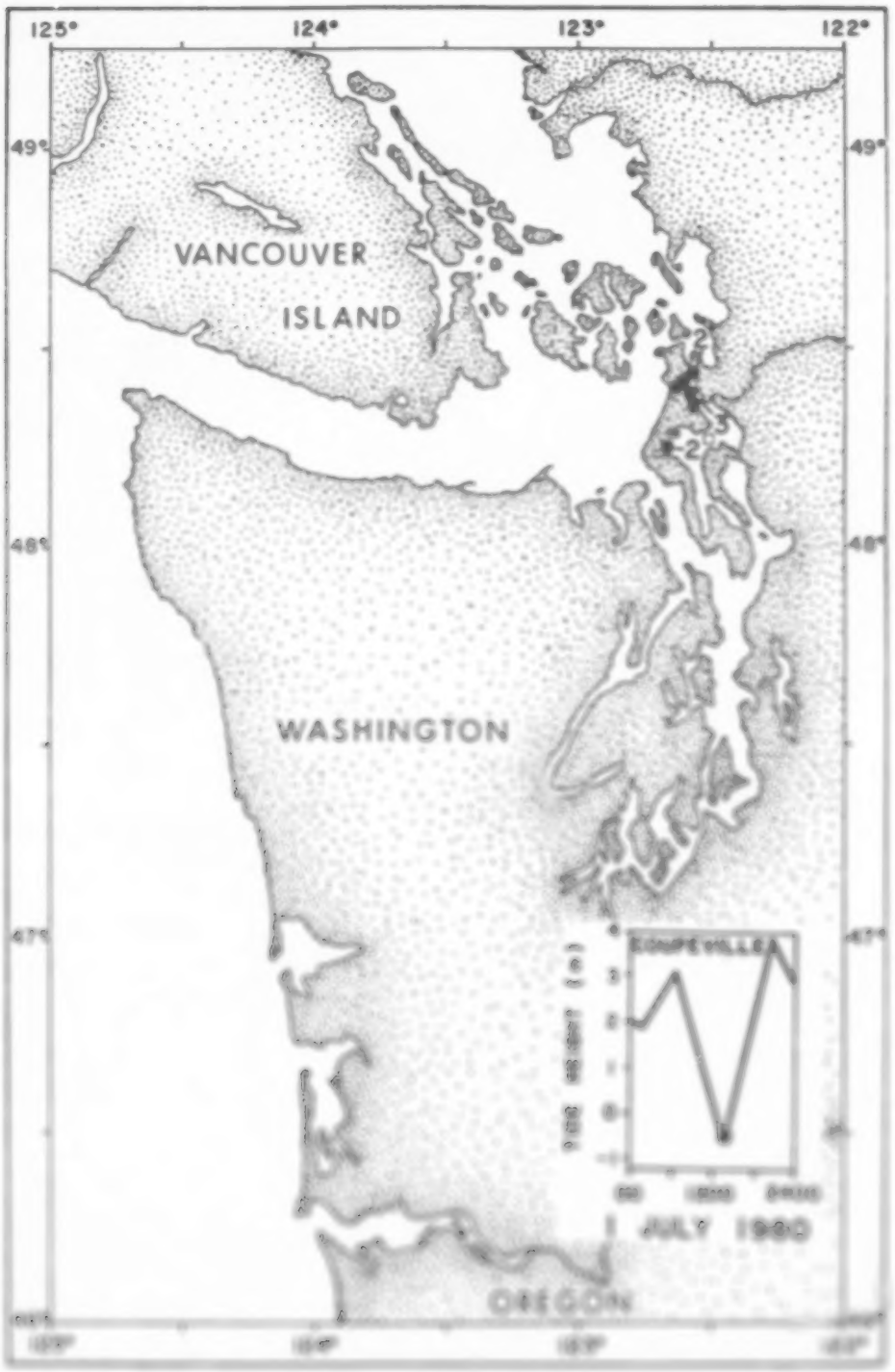
WASHINGTON
COUPEVILLE
TIDE HEIGHT (m)
2 JULY 1980
OREGON

[illegible]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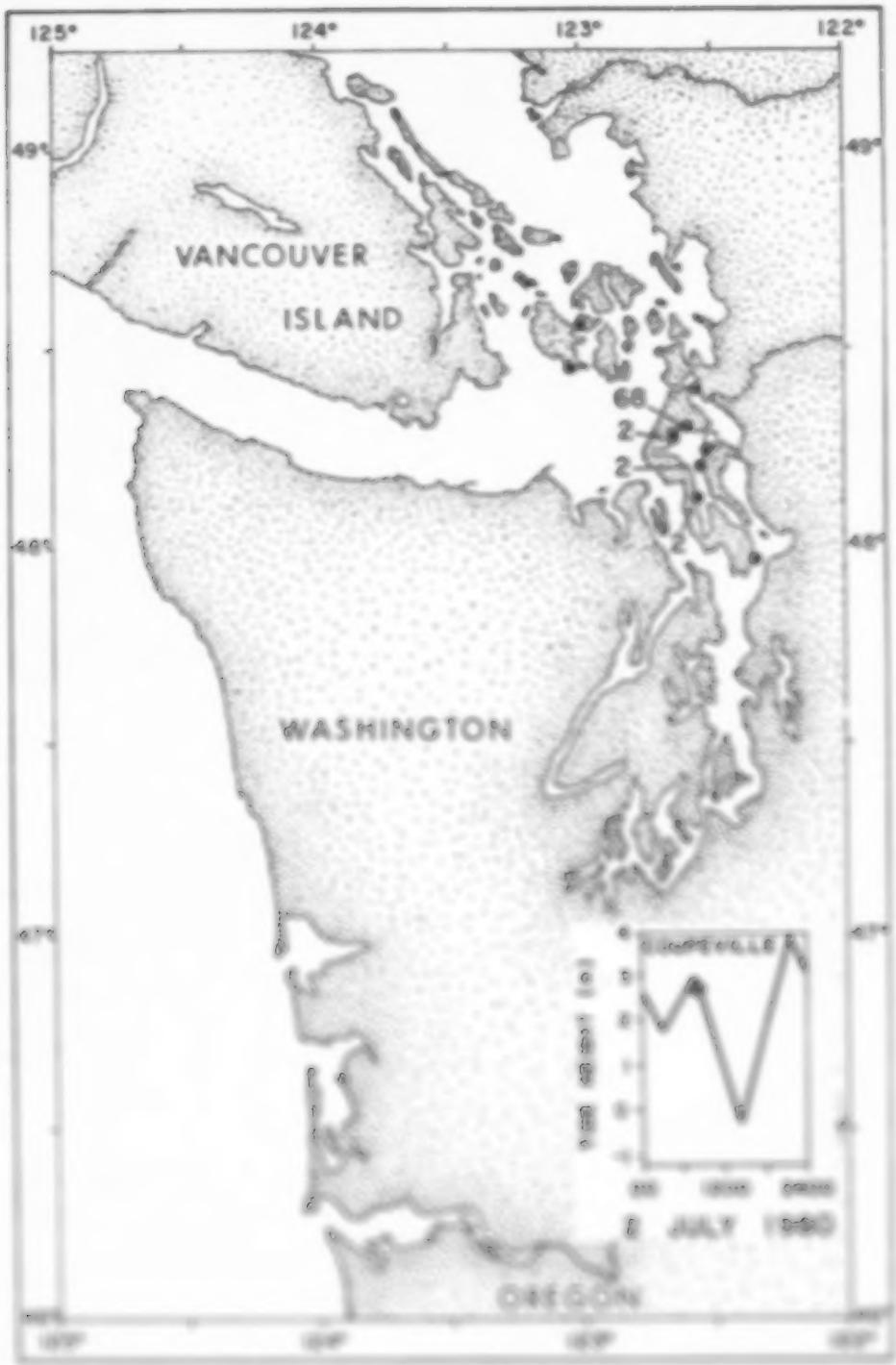
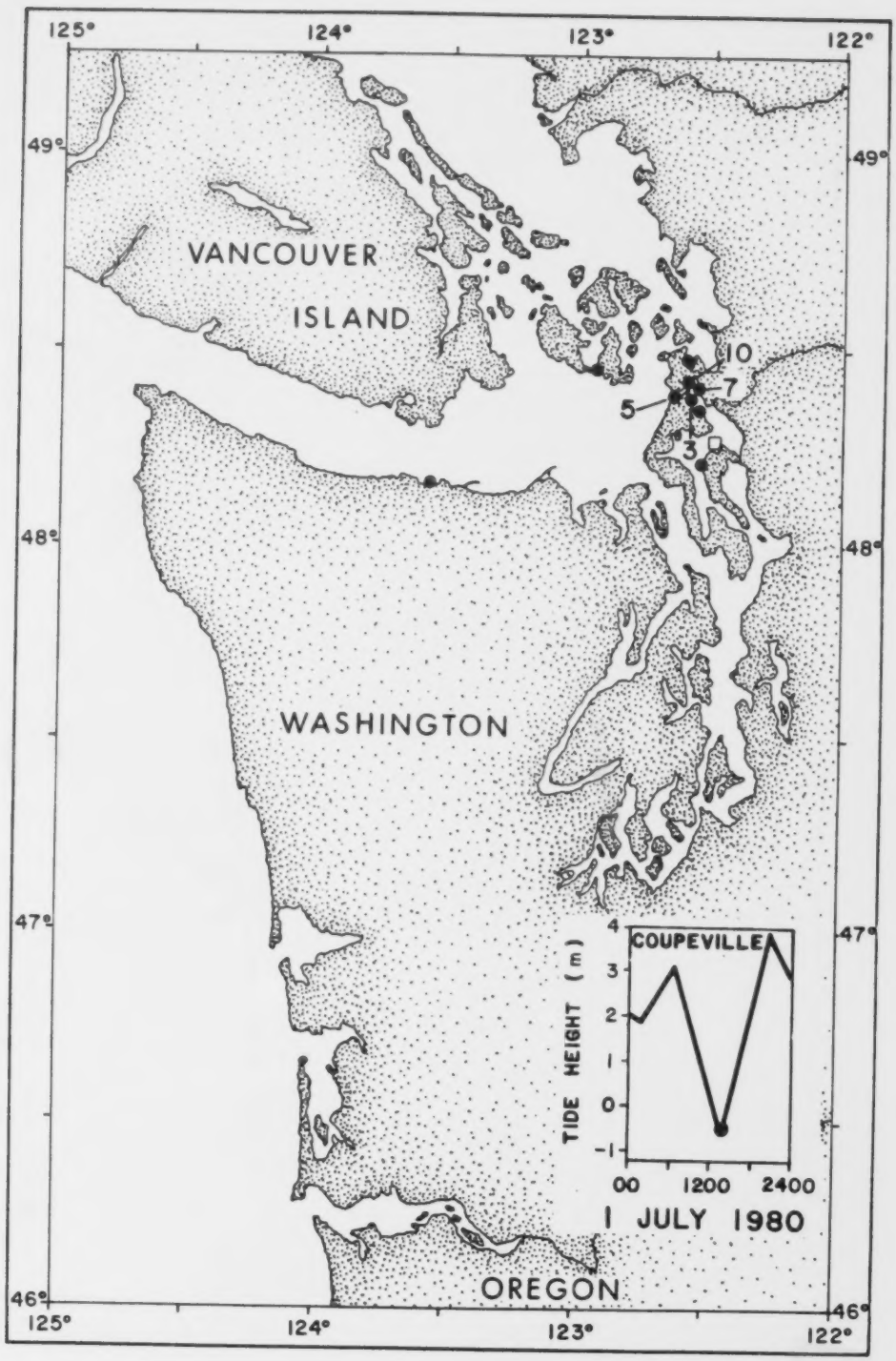
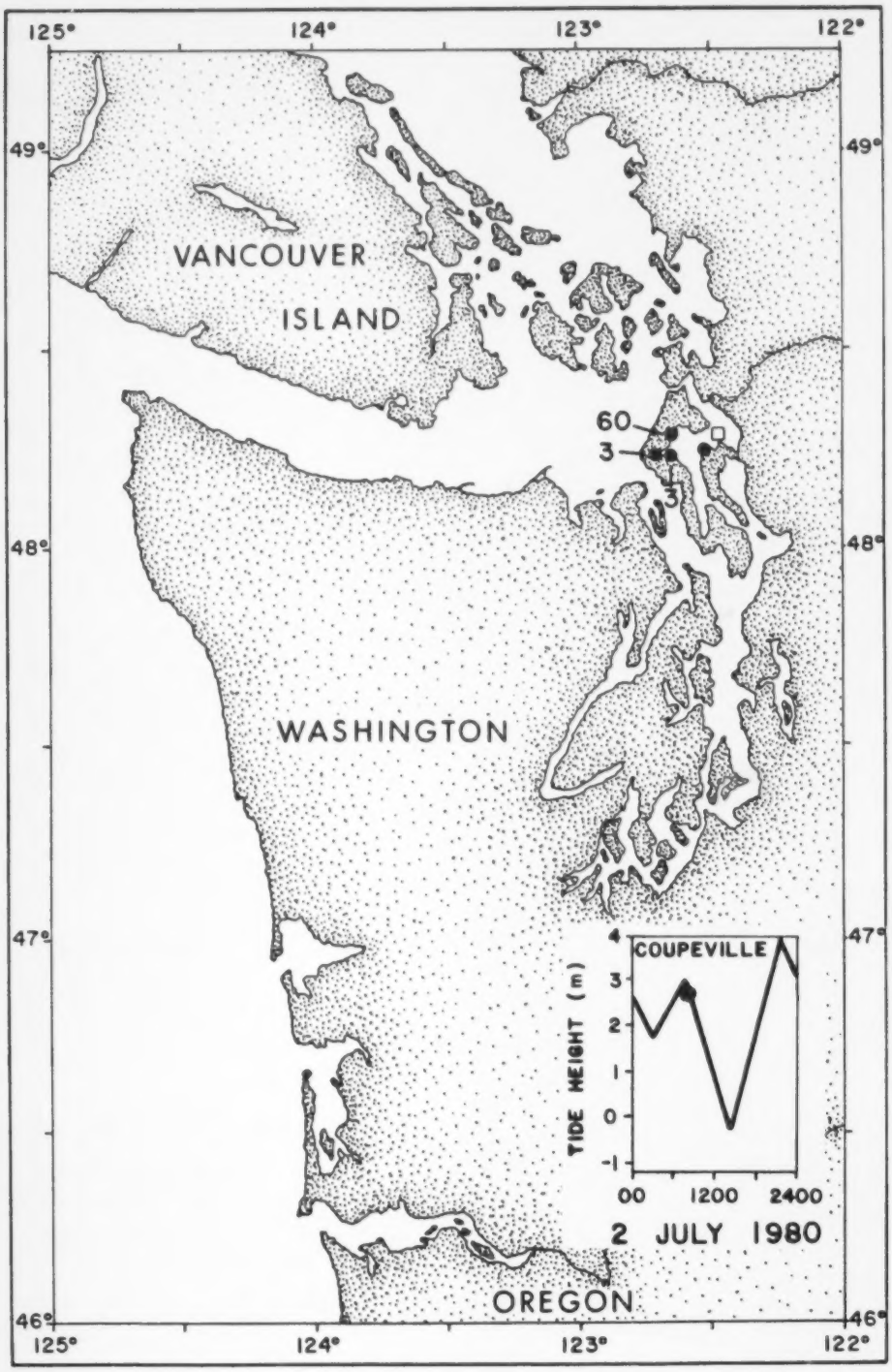
JULY 1980



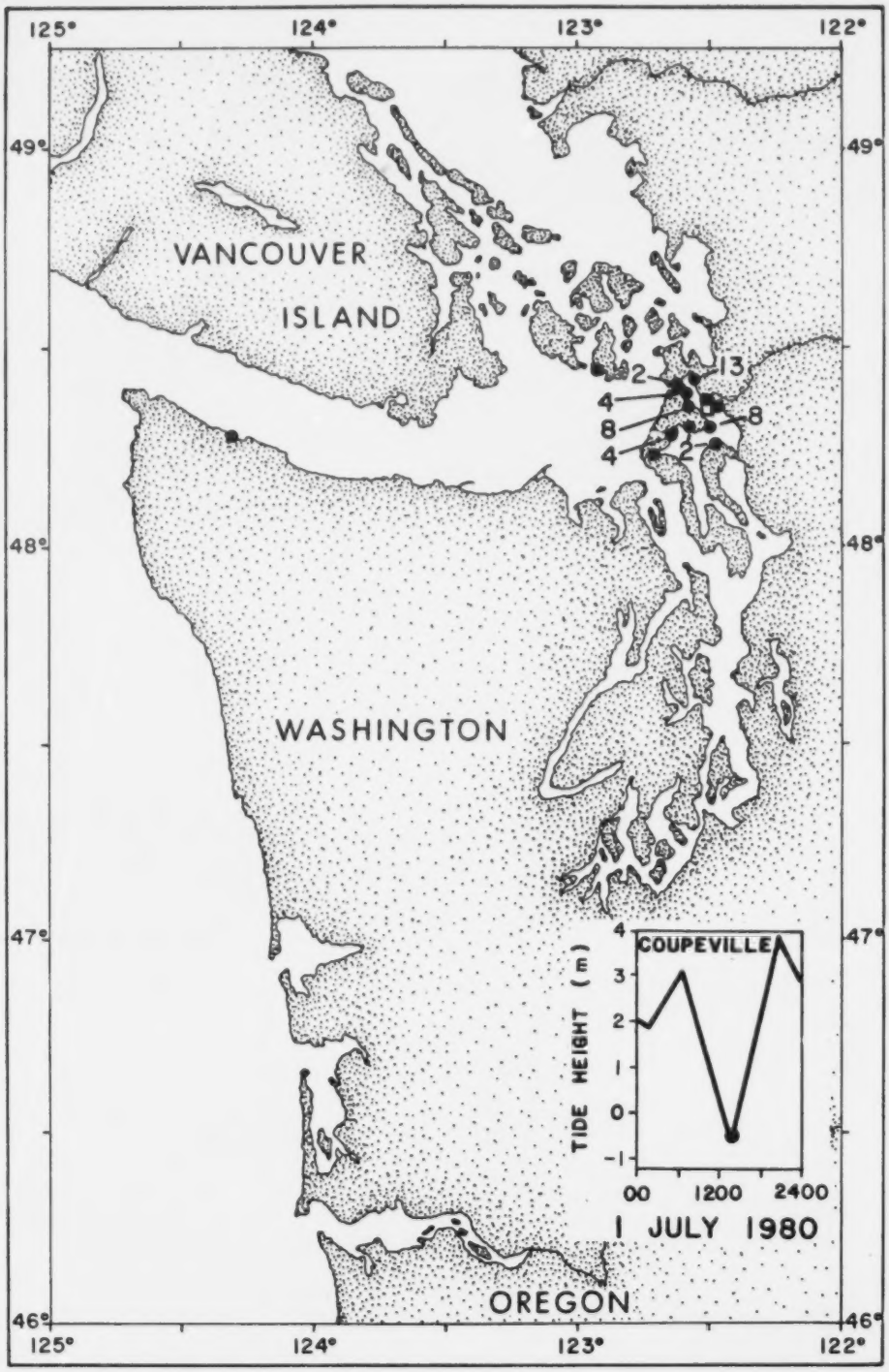
Appendix B-17. Recovery positions of drift cards released 1980-1990 released on Day 30.



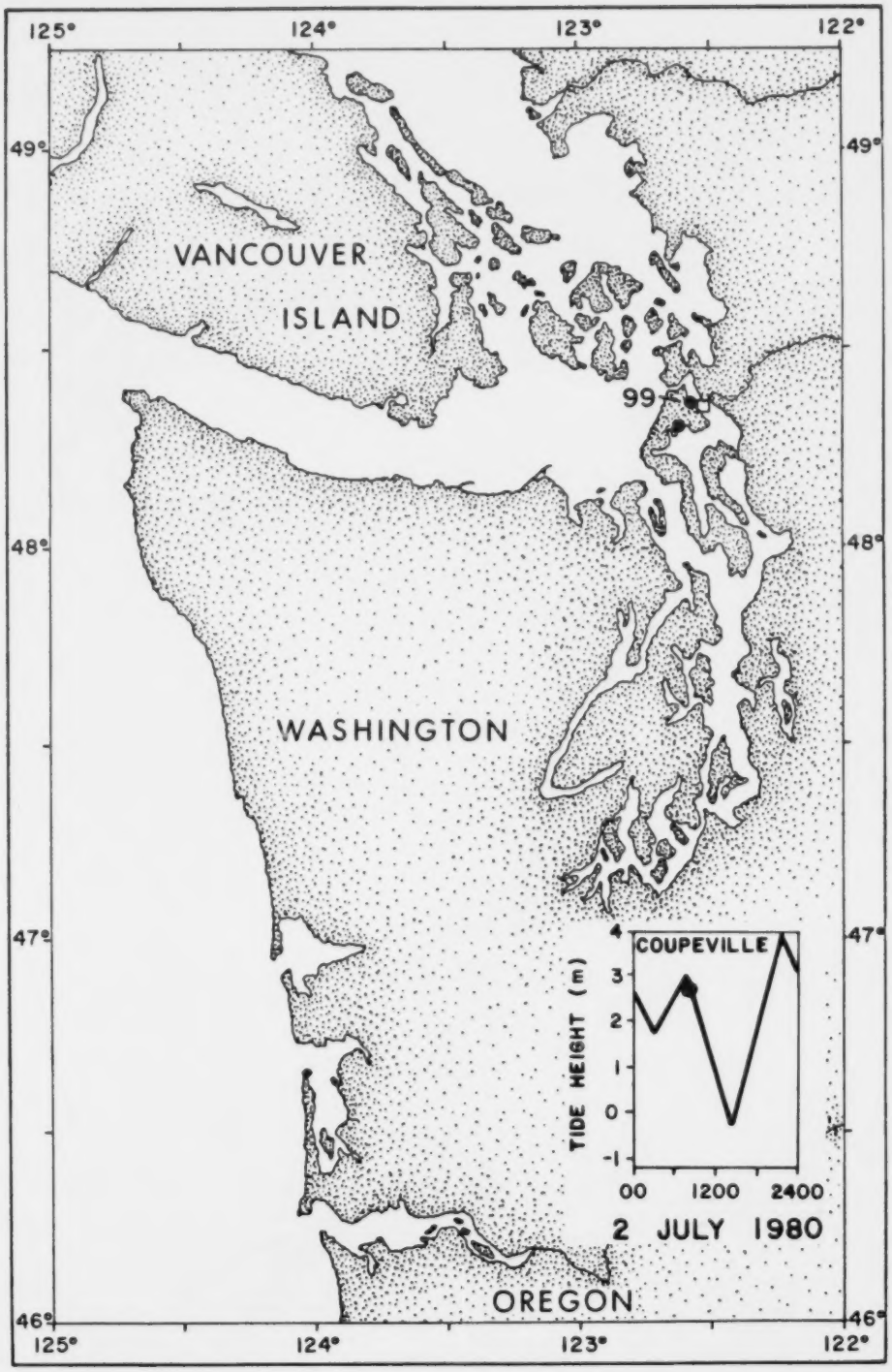
Appendix A.48. Recovery positions of drift cards numbered 11800-11899 released at Site 21.



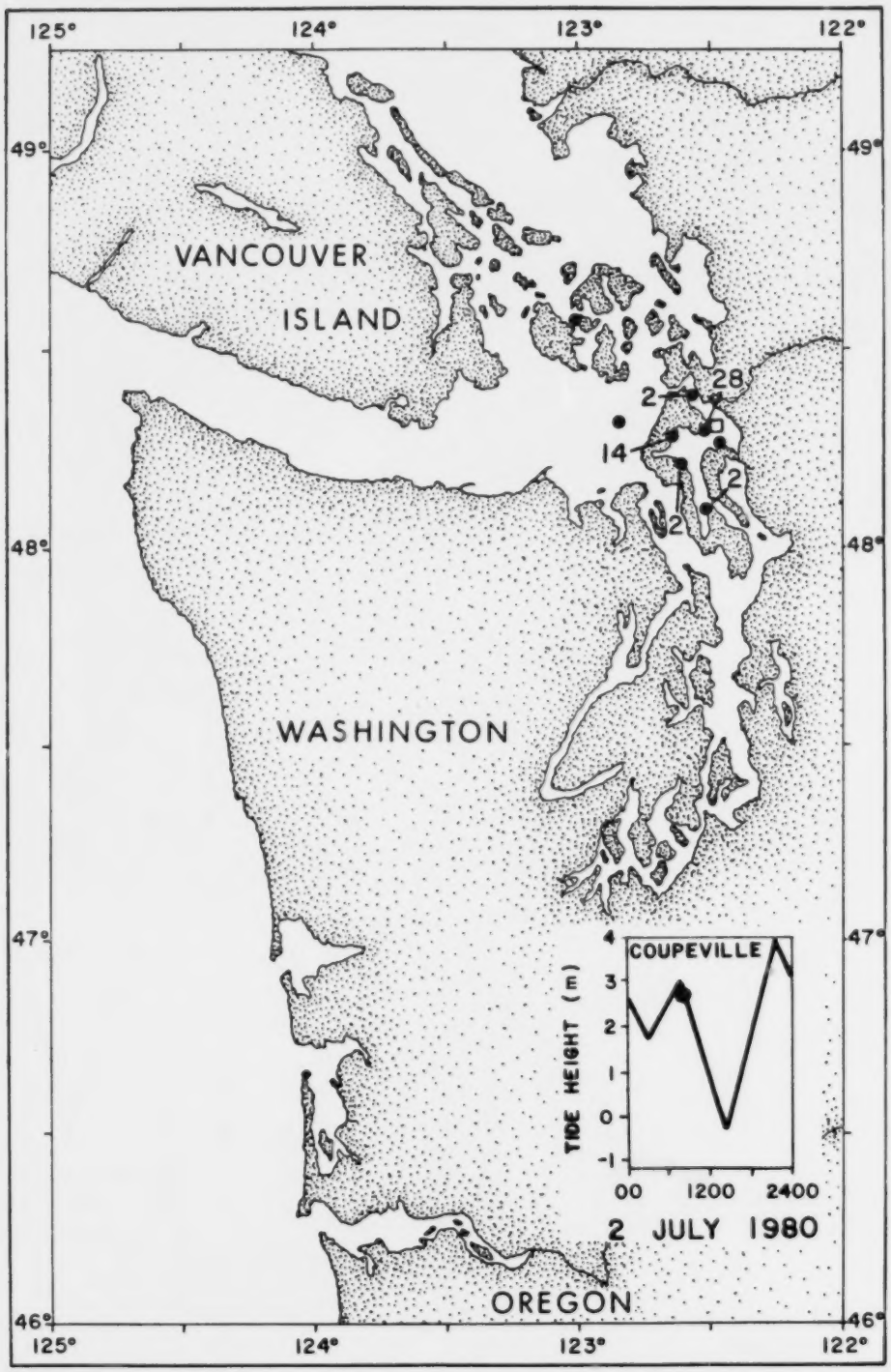
Appendix A.49. Recovery positions of drift cards numbered 13800-13899 released at Site 21.



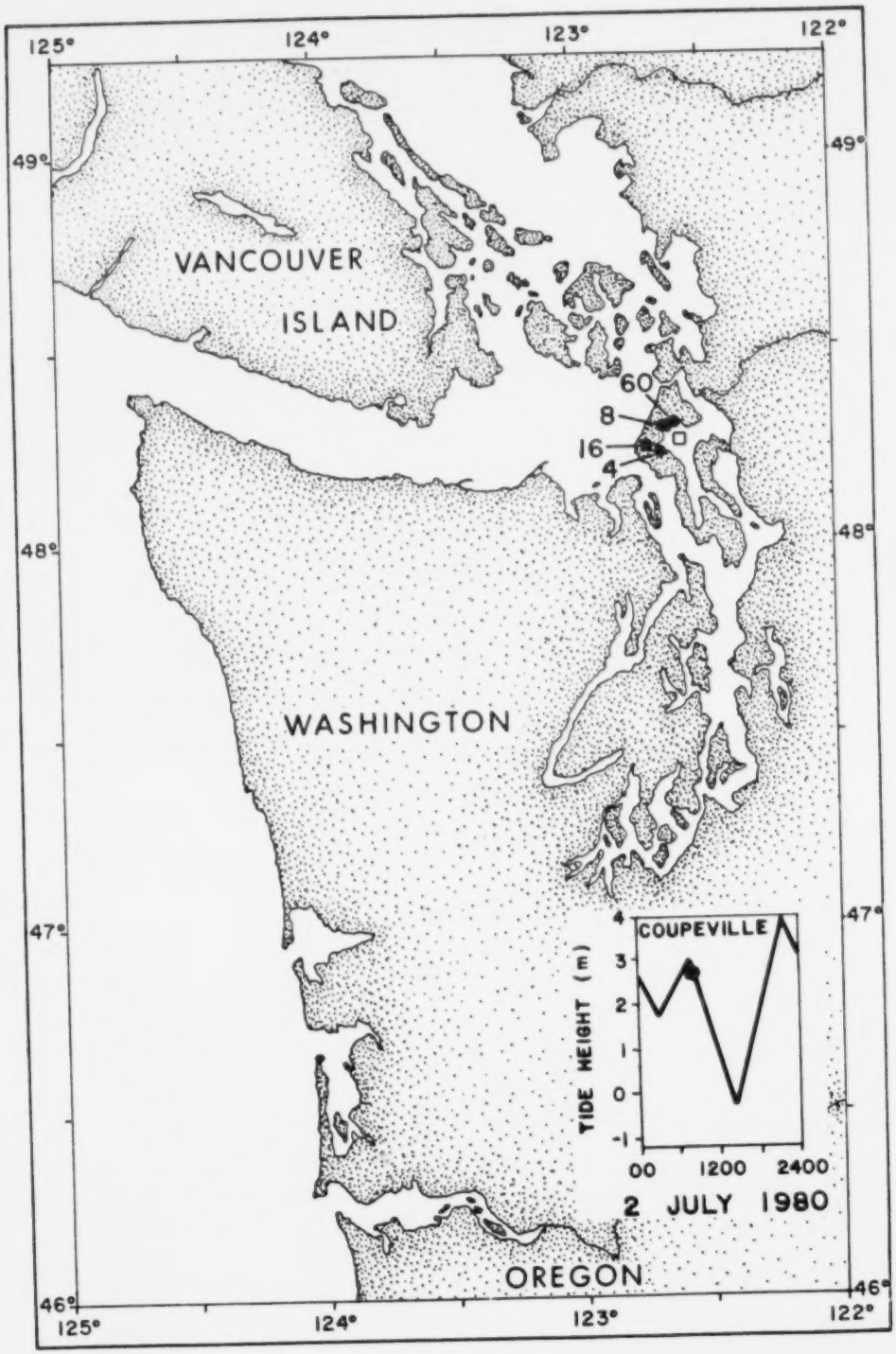
Appendix A.50. Recovery positions of drift cards numbered 14100-14199 released at Site 22.



Appendix A.51. Recovery positions of drift cards numbered 14200-14299 released at Site 22.



Appendix A.52. Recovery positions of drift cards numbered 14300-14399 released at Site 23.



Appendix A.53. Recovery positions of drift cards numbered 14500-14599 released at Site 24.

APPENDIX B

Dates, Times, and Positions of the Release and Recoveries (as Reported to NOAA by 30 September 1980) of Drift Card Nos. 9001-9700 and 10000-14599. Listings are in order by Card Number. Dates and Times Listed are in Pacific Daylight Time.

Appendix B.1. Dates, times, and positions of the release (launch) and recoveries of drift cards numbered 9001-9100.

DRIFT CARDS	DATE	TIME	LATITUDE (DEG N)	LONGITUDE (DEG W)
LAUNCH	4 24 78	1431	48 8.6	123 23.6
9001	5 17 78		48 7.0	123 25.0
9002	4 28 78		48 23.4	122 39.8
9004	5 1 78		48 10.0	123 8.3
9005	5 28 78		48 9.7	123 42.5
9007	5 4 78		48 17.3	122 44.6
9009	4 27 78		48 23.4	122 39.8
9014	5 20 78		48 40.3	122 54.5
9017	5 20 78		48 40.3	122 54.5
9018	6 9 78		48 30.5	122 54.8
9020	5 4 78		48 28.7	122 39.5
9022	5 29 78		48 22.8	122 40.0
9026	5 16 78		47 54.7	124 38.3
9033	5 2 78		48 21.9	122 30.0
9039	5 6 78		48 10.4	123 8.8
9044	4 26 78		48 8.5	123 25.4
9046	4 28 78		48 7.6	123 13.2
9048	5 11 78		48 8.5	123 25.4
9051	5 3 78		48 25.0	122 34.0
9052	4 29 78		48 25.0	122 34.0
9058	5 2 78		48 10.2	123 9.2
9063	5 21 78		48 21.7	122 39.9
9065	5 26 78		48 28.7	122 39.5
9066	5 4 78		48 25.0	122 39.0
9069	4 27 78		48 23.4	122 39.8
9071	5 7 78		48 8.5	123 25.4
9073	4 29 78		48 23.4	122 39.8
9074	4 26 78		48 8.5	123 25.4
9076	5 2 78		48 25.3	122 39.7
9079	6 3 78		48 8.4	123 24.4
9082	4 30 78		48 28.7	122 39.5
9084	5 20 78		48 21.8	122 30.4
9085	5 5 78		48 55.6	122 49.2
9086	4 25 78		48 11.5	122 42.4
9087	5 6 78		48 26.8	122 34.4
9088	5 2 78		48 22.8	122 40.0
9095	5 28 78		48 16.7	122 43.9
9096	5 3 78		48 21.9	122 30.0

Appendix B.2. Dates, times, and positions of the release (launch) and recoveries of drift cards numbered 9101-9200.

DRIFT CARDS	DATE	TIME	LATITUDE (DEG N)	LONGITUDE (DEG W)
LAUNCH	4 25 78	1219	48 7.9	123 25.6
9110	5 15 78		48 26.8	122 34.4
9113	5 1 78		48 21.9	122 30.0
9115	5 29 78		48 16.7	122 43.9
9117	5 2 78		48 18.0	122 43.4
9118	5 2 78		48 21.9	122 30.0
9130	4 27 78		48 8.2	123 11.6
9131	5 8 78		48 16.7	122 43.9
9136	5 9 78		48 17.0	122 43.7
9139	5 6 78		48 28.7	122 39.5
9153	5 17 78		48 17.3	122 44.6
9157	4 30 78		48 7.1	123 21.2
9167	5 2 78		48 10.8	123 7.6
9171	4 29 78		48 10.6	123 8.4
9172	5 9 78		48 17.0	122 43.7
9174	5 7 78		48 9.4	122 40.8
9181	4 28 78		48 25.0	122 34.0
9185	6 11 78		48 20.3	122 41.3
9187	4 29 78		48 16.7	122 43.9
9188	4 28 78		48 23.9	122 38.1
9189	7 5 78		48 51.7	122 44.8
9197	5 2 78		48 21.9	122 30.0
9199	5 1 78		48 14.7	122 46.3
9200	4 30 78		48 21.7	122 39.9

Appendix B.3. Dates, times, and positions of the release (launch) and recoveries of drift cards numbered 9201-9300.

DRIFT CARDS	DATE	TIME	LATITUDE (DEG N)	LONGITUDE (DEG W)
LAUNCH	4 26 78	0726	48 7.8	123 24.2
9201	5 4 78		48 18.6	122 42.7
9202	4 29 78		48 18.6	122 42.7
9208	5 3 78		48 18.3	122 43.3
9209	5 3 78		48 26.7	122 40.5
9210	5 9 78		48 17.0	122 43.7
9211	5 5 78		48 25.3	122 33.7
9214	5 14 78		48 18.6	122 42.7
9215	5 2 78		48 10.2	123 9.2
9216	5 27 78		48 24.4	123 21.2
9219	5 21 78		48 8.5	122 36.5
9220	4 30 78		48 21.7	122 39.9
9223	5 13 78		48 17.7	122 43.6
9226	5 2 78		48 18.0	122 43.4
9228	5 7 78		48 17.3	122 44.6
9232	5 15 78		48 35.1	123 8.9
9234	5 31 78		48 21.2	122 39.8
9237	5 31 78		48 16.5	122 44.0
9238	5 2 78		48 10.8	123 7.6
9239	5 13 78		48 17.7	122 43.6
9245	4 29 78		48 18.6	122 42.7
9251	4 30 78		48 21.7	122 39.9
9254	5 15 78		48 6.3	122 53.0
9256	5 13 78		48 35.1	123 8.9
9257	6 4 78		48 25.7	122 52.6
9262	5 6 78		48 3.8	123 .8
9265	4 30 78		48 21.7	122 39.9
9270	5 18 78		48 2.9	122 35.7
9271	8 3 78		48 3.0	122 50.0
9274	7 2 78		48 24.2	122 37.9
9276	5 27 78		48 24.4	123 21.2
9287	5 7 78		48 18.6	122 42.7
9288	5 2 78		48 10.8	123 7.6
9289	5 21 78		48 9.4	122 40.8
9293	5 21 78		48 16.7	122 43.9
9295	5 14 78		48 4.6	122 53.4
9296	5 27 78		48 24.4	123 21.2
9300	5 30 78		48 6.3	122 53.0

Appendix B.4. Dates, times, and positions of the release (launch) and recoveries of drift cards numbered 9301-9400.

DRIFT CARDS	DATE	TIME	LATITUDE (DEG N)	LONGITUDE (DEG W)
LAUNCH	4 27 78	1441	48 8.4	123 23.6
9302	4 28 78		48 10.2	123 9.2
9303	5 26 78		48 10.6	123 8.4
9304	4 28 78		48 10.2	123 9.2
9305	4 28 78		48 10.2	123 9.2
9306	4 28 78		48 10.2	123 9.2
9309	4 28 78		48 10.2	123 9.2
9310	4 28 78		48 10.2	123 9.2
9311	4 28 78		48 10.2	123 9.2
9312	5 14 78		48 10.0	123 9.6
9313	4 28 78		48 10.2	123 9.2
9316	5 2 78		48 7.3	123 20.5
9317	4 28 78		48 10.2	123 9.2
9319	4 28 78		48 10.2	123 9.2
9320	4 28 78		48 10.2	123 9.2
9321	4 29 78		48 10.6	123 .4
9322	4 28 78		48 10.2	123 9.2
9323	4 28 78		48 10.2	123 9.2
9324	4 28 78		48 8.4	123 24.0
9325	4 28 78		48 10.2	123 9.2
9326	4 28 78		48 10.2	123 9.2
9327	4 28 78		48 10.2	123 9.2
9328	5 2 78		48 10.8	123 7.6
9332	4 28 78		48 10.2	123 9.2
9333	4 28 78		48 10.2	123 9.2
9335	4 28 78		48 10.2	123 9.2
9336	4 28 78		48 11.0	123 6.2
9338	4 28 78		48 11.0	123 6.2
9339	4 28 78		48 11.0	123 6.2
9340	4 28 78		48 11.0	123 6.2
9341	4 28 78		48 11.0	123 6.2
9342	4 28 78		48 11.0	123 6.2
9343	4 28 78		48 11.0	123 6.2
9344	4 28 78		48 8.4	123 24.0
9345	4 28 78		48 11.0	123 6.2
9346	4 28 78		48 11.0	123 6.2
9347	4 28 78		48 11.0	123 6.2
9348	4 28 78		48 11.0	123 6.2
9349	4 28 78		48 11.0	123 6.2
9350	4 28 78		48 11.0	123 6.2
9351	4 28 78		48 11.0	123 6.2
9352	4 28 78		48 11.0	123 6.2
9354	4 28 78		48 11.0	123 6.2
9355	4 28 78		48 11.0	123 6.2
9356	4 28 78		48 11.0	123 6.2
9358	5 6 78		48 10.2	123 9.2
9359	4 28 78		48 11.0	123 6.2
9360	4 28 78		48 11.0	123 6.2
9361	4 28 78		48 11.0	123 6.2
9362	4 28 78		48 11.0	123 6.2
9364	5 6 78		48 10.2	123 9.2
9366	4 28 78		48 11.0	123 6.2
9367	4 28 78		48 11.0	123 6.2
9370	4 28 78		48 11.0	123 6.2
9371	4 28 78		48 11.0	123 6.2
9372	4 28 78		48 11.0	123 6.2
9374	4 28 78		48 11.0	123 6.2
9376	6 23 78		48 6.3	122 53.0
9377	4 28 78		48 11.0	123 6.2
9379	4 28 78		48 11.0	123 6.2
9380	4 28 78		48 11.0	123 6.2
9381	4 28 78		48 11.0	123 6.2
9382	4 28 78		48 11.0	123 6.2
9383	4 28 78		48 11.0	123 6.2
9384	4 28 78		48 11.0	123 6.2
9385	4 28 78		48 11.0	123 6.2
9386	4 28 78		48 11.0	123 6.2
9387	4 28 78		48 11.0	123 6.2
9390	5 6 78		48 10.2	123 9.2
9391	5 6 78		48 10.2	123 9.2
9394	4 28 78		48 11.0	123 6.2
9396	4 28 78		48 11.0	123 6.2
9399	4 28 78		48 11.0	123 6.2
9400	4 28 78		48 11.0	123 6.2

Appendix B.5. Dates, times, and positions of the release (launch) and recoveries of drift cards numbered 9401-9500.

DRIFT CARDS	DATE	TIME	LATITUDE (DEG N)	LONGITUDE (DEG W)
LAUNCH	4 30 78	1009	48 8.3	123 24.5
9402	5 6 78		48 10.2	123 9.2
9404	4 30 78		48 10.0	123 9.6
9409	5 6 78		48 10.2	123 9.2
9413	5 12 78		48 8.0	123 25.0
9419	5 18 78		48 8.7	123 34.0
9421	5 3 78		48 10.6	123 8.4
9422	5 2 78		48 7.3	123 20.5
9425	5 2 78		48 7.3	123 20.5
9429	5 6 78		48 10.2	123 9.2
9434	5 3 78		48 10.0	123 8.4
9438	5 6 78		48 10.2	123 9.2
9443	5 2 78		48 7.3	123 20.5
9445	5 3 78		48 10.2	123 9.2
9452	5 6 78		48 10.4	123 8.8
9458	5 3 78		48 10.6	123 8.4
9459	5 6 78		48 10.2	123 9.2
9460	5 3 78		48 10.0	123 8.4
9462	5 6 78		48 10.6	123 8.4
9466	5 6 78		48 10.2	123 9.2
9467	5 3 78		48 10.0	123 8.4
9468	5 2 78		48 7.3	123 20.5
9470	5 20 78		48 3.0	122 50.0
9471	5 6 78		48 8.5	123 25.4
9472	4 30 78		48 10.0	123 9.6
9473	5 29 78		48 26.6	123 2.2
9476	5 5 78		48 10.2	123 9.2
9477	5 6 78		48 10.2	123 9.2
9488	5 3 78		48 7.3	123 20.5
9492	5 6 78		48 10.2	123 9.2
9494	5 2 78		48 7.3	123 20.5
9495	6 2 78		48 7.0	124 41.7

Appendix B.6. Dates, times, and positions of the release (launch) and recoveries of drift cards numbered 9501-9600.

DRIFT CARDS	DATE	TIME	LATITUDE (DEG N)	LONGITUDE (DEG W)
LAUNCH	4 30 78	1015	48 8.4	123 23.9
9502	5 5 78		48 5.7	122 54.8
9505	5 2 78		48 10.6	123 8.4
9510	5 13 78		48 25.7	122 51.7
9512	5 5 78		48 5.7	122 54.8
9516	5 2 78		48 7.3	123 20.5
9517	5 2 78		48 10.2	123 9.2
9520	5 29 78		48 26.0	123 26.0
9527	6 11 78		47 23.0	124 21.0
9532	5 6 78		48 10.6	123 8.4
9536	5 2 78		48 10.8	123 7.6
9539	5 2 78		48 10.8	123 7.6
9541	5 6 78		48 10.6	123 8.4
9544	5 2 78		48 7.3	123 20.5
9545	5 6 78		48 10.2	123 9.2
9550	5 2 78		48 10.8	123 7.6
9552	5 5 78		48 7.1	123 21.2
9555	5 6 78		48 8.9	123 18.4
9556	5 8 78		48 10.2	123 9.2
9557	5 6 78		48 10.2	123 9.2
9558	5 2 78		48 10.2	123 9.2
9559	5 2 78		48 10.8	123 7.6
9560	5 2 78		48 7.3	123 20.5
9566	5 2 78		48 10.2	123 9.2
9569	5 3 78		48 10.0	123 8.4
9571	5 4 78		48 5.7	122 54.8
9573	6 2 78		48 7.8	122 51.4
9576	5 2 78		48 10.8	123 7.6
9578	5 2 78		48 7.3	123 20.5
9579	5 6 78		48 10.2	123 9.2
9585	5 2 78		48 10.8	123 7.6
9587	5 21 78		48 15.8	124 17.8
9595	5 8 78		48 10.2	123 9.2
9596	5 2 78		48 11.0	123 8.4

Appendix B.7. Dates, times, and positions of the release (launch) and recoveries of drift cards numbered 9601-9700.

DRIFT CARDS	DATE	TIME	LATITUDE (DEG N)	LONGITUDE (DEG W)
LAUNCH	4 30 78	1020	48 8.6	123 24.5
9603	5 6 78		48 10.2	123 9.2
9605	5 6 78		48 10.0	123 9.6
9606	5 6 78		48 10.4	123 8.8
9612	5 29 78		48 24.1	123 21.9
9614	5 6 78		48 10.2	123 9.2
9615	5 6 78		48 10.2	123 9.2
9617	5 3 78		48 7.3	123 20.5
9619	5 6 78		48 10.2	123 9.2
9621	5 6 78		48 10.4	123 8.8
9622	5 2 78		48 7.3	123 20.5
9625	5 2 78		48 7.3	123 20.5
9626	4 30 78		48 10.6	123 8.4
9630	5 8 78		48 10.2	123 9.2
9631	5 6 78		48 10.2	123 9.2
9632	5 6 78		48 10.6	123 8.4
9633	5 6 78		48 10.4	123 8.8
9634	5 6 78		48 10.2	123 9.2
9635	5 6 78		48 10.2	123 9.2
9637	5 14 78		48 8.3	123 36.6
9638	5 6 78		48 10.2	123 9.2
9639	5 2 78		48 7.3	123 20.5
9640	6 11 78		48 58.5	125 37.0
9642	5 3 78		48 7.3	123 20.5
9643	5 6 78		48 10.2	123 9.2
9647	5 6 78		48 10.2	123 9.2
9664	5 6 78		48 10.2	123 9.2
9667	5 3 78		48 10.0	123 8.4
9668	5 6 78		48 10.2	123 9.2
9670	5 6 78		48 6.9	123 18.4
9674	5 8 78		48 10.6	123 8.4
9675	5 3 78		48 7.3	123 20.5
9676	5 6 78		48 10.4	123 8.8
9678	5 2 78		48 7.3	123 20.5
9679	5 6 78		48 10.6	123 8.4
9680	5 6 78		48 10.2	123 8.9
9681	5 3 78		48 10.2	123 9.2
9685	5 3 78		48 10.2	123 9.2
9687	5 6 78		48 10.0	123 9.6

Appendix B.8. Dates, times, and positions of the release (launch) and recoveries of drift cards numbered 10000-10099.

DRIFT CARDS	DATE	TIME	LATITUDE (DEG N)	LONGITUDE (DEG W)
LAUNCH	7 1 80	1240	48 7.5	123 17.3
10000	7 8 80		48 11.2	123 6.2
10001	7 8 80		48 11.2	123 6.2
10002	7 8 80		48 11.2	123 6.2
10003	7 8 80		48 11.2	123 6.2
10004	7 8 80		48 11.2	123 6.2
10005	7 8 80		48 11.2	123 6.2
10006	7 8 80		48 11.2	123 6.2
10007	7 8 80		48 11.2	123 6.2
10008	7 8 80		48 11.2	123 6.2
10009	7 8 80		48 11.2	123 6.2
10010	7 8 80		48 11.2	123 6.2
10011	7 8 80		48 11.2	123 6.2
10012	7 8 80		48 11.2	123 6.2
10013	7 8 80		48 11.2	123 6.2
10015	7 8 80		48 11.2	123 6.2
10016	7 8 80		48 11.2	123 6.2
10017	7 8 80		48 11.2	123 6.2
10018	7 8 80		48 11.2	123 6.2
10019	7 8 80		48 11.2	123 6.2
10020	7 8 80		48 11.2	123 6.2
10023	7 8 80		48 11.2	123 6.2
10024	7 8 80		48 11.2	123 6.2
10025	7 8 80		48 11.2	123 6.2
10026	9 22 80	1200	48 9.6	123 10.3
10027	7 8 80		48 11.2	123 6.2
10031	7 8 80		48 11.2	123 6.2
10032	7 8 80		48 11.2	123 6.2
10033	7 8 80		48 11.2	123 6.2
10038	7 8 80		48 11.2	123 6.2
10039	7 5 80		48 10.3	123 9.2
10041	7 8 80		48 11.2	123 6.2
10042	7 8 80		48 11.2	123 6.2
10043	7 8 80		48 11.2	123 6.2
10047	7 8 80		48 11.2	123 6.2
10049	7 8 80		48 11.2	123 6.2
10051	7 8 80		48 11.2	123 6.2
10052	7 8 80		48 11.2	123 6.2
10054	7 8 80		48 11.2	123 6.2
10056	7 2 80		48 10.5	123 8.3
10057	7 8 80		48 11.2	123 6.2
10058	7 8 80		48 11.2	123 6.2
10060	7 8 80		48 11.2	123 6.2
10061	7 8 80		48 11.2	123 6.2
10064	7 8 80		48 11.2	123 6.2
10066	7 8 80		48 11.2	123 6.2
10067	7 8 80		48 11.2	123 6.2
10069	7 8 80		48 11.2	123 6.2
10073	7 8 80		48 11.2	123 6.2
10074	7 8 80		48 11.2	123 6.2
10075	7 8 80		48 11.2	123 6.2
10076	7 8 80		48 11.2	123 6.2
10077	7 8 80		48 11.2	123 6.2
10078	7 2 80		48 10.5	123 8.3
10081	7 8 80		48 11.2	123 6.2
10084	7 8 80		48 11.2	123 6.2
10087	7 8 80		48 11.2	123 6.2
10088	7 8 80		48 11.2	123 6.2
10090	7 8 80		48 11.2	123 6.2
10091	7 8 80		48 11.2	123 6.2
10094	7 5 80		48 10.5	123 8.3
10096	7 8 80		48 11.2	123 6.2
10097	7 8 80		48 11.2	123 6.2
10098	7 8 80		48 11.2	123 6.2
10099	7 8 80		48 11.2	123 6.2

Appendix B.9. Dates, times, and positions of the release (launch) and recoveries of drift cards numbered 10100-10199.

DRIFT CARDS	DATE	TIME	LATITUDE (DEG N)	LONGITUDE (DEG W)
LAUNCH	7 1 80	1242	48 7.9	123 20.7
10101	7 2 80		48 8.8	123 11.2
10102	7 2 80		48 8.8	123 11.2
10103	7 7 80		48 10.3	123 9.2
10104	7 2 80		48 8.8	123 11.2
10105	7 2 80		48 8.8	123 11.2
10106	7 2 80		48 8.8	123 11.2
10107	7 2 80		48 8.8	123 11.2
10108	7 2 80		48 8.8	123 11.2
10109	7 2 80		48 8.8	123 11.2
10110	7 2 80		48 8.8	123 11.2
10111	7 2 80		48 8.8	123 11.2
10112	7 2 80		48 8.8	123 11.2
10113	7 2 80		48 8.8	123 11.2
10115	7 2 80		48 8.8	123 11.2
10116	7 2 80		48 8.8	123 11.2
10117	7 2 80		48 8.8	123 11.2
10118	7 2 80		48 8.8	123 11.2
10119	7 2 80		48 8.8	123 11.2
10120	7 2 80		48 8.8	123 11.2
10121	7 2 80		48 8.8	123 11.2
10122	7 4 80		48 10.9	123 6.8
10123	7 2 80		48 8.8	123 11.2
10125	7 2 80		48 8.8	123 11.2
10126	7 2 80		48 8.8	123 11.2
10127	7 2 80		48 8.8	123 11.2
10128	7 2 80		48 8.8	123 11.2
10129	7 2 80		48 8.8	123 11.2
10130	7 2 80		48 8.8	123 11.2
10132	7 2 80		48 8.8	123 11.2
10133	7 2 80		48 8.8	123 11.2
10134	7 2 80		48 8.8	123 11.2
10135	7 2 80		48 8.8	123 11.2
10136	7 2 80		48 10.5	123 8.3
10137	7 2 80		48 8.8	123 11.2
10138	7 2 80		48 8.8	123 11.2
10139	7 2 80		48 8.8	123 11.2
10140	7 2 80		48 8.8	123 11.2
10141	7 2 80		48 8.8	123 11.2
10142	7 2 80		48 8.8	123 11.2
10143	7 2 80		48 8.8	123 11.2
10144	7 2 80		48 8.8	123 11.2
10145	7 2 80		48 8.8	123 11.2
10146	7 2 80		48 8.8	123 11.2
10147	7 2 80		48 8.8	123 11.2
10148	7 2 80		48 8.8	123 11.2
10149	7 2 80		48 8.8	123 11.2
10150	7 2 80		48 8.8	123 11.2
10151	7 2 80		48 8.8	123 11.2
10152	7 2 80		48 8.8	123 11.2
10153	7 2 80		48 8.8	123 11.2
10154	7 2 80		48 8.8	123 11.2
10155	7 2 80		48 8.8	123 11.2
10156	7 2 80		48 8.8	123 11.2
10157	7 2 80		48 8.8	123 11.2
10159	7 2 80		48 8.8	123 11.2
10160	7 2 80		48 8.8	123 11.2
10162	7 2 80		48 8.8	123 11.2
10164	7 2 80		48 8.8	123 11.2
10165	7 2 80		48 8.8	123 11.2
10166	7 2 80		48 8.8	123 11.2
10167	7 2 80		48 8.8	123 11.2
10168	7 2 80		48 8.8	123 11.2
10169	7 2 80		48 8.8	123 11.2
10170	7 2 80		48 8.8	123 11.2
10171	7 2 80		48 8.8	123 11.2
10172	7 2 80		48 8.8	123 11.2
10173	7 2 80		48 8.8	123 11.2
10175	7 2 80		48 8.8	123 11.2
10176	7 2 80		48 8.8	123 11.2
10178	7 2 80		48 8.8	123 11.2
10180	7 2 80		48 8.8	123 11.2
10181	7 2 80		48 8.8	123 11.2
10182	7 2 80		48 8.8	123 11.2
10184	7 2 80		48 8.8	123 11.2
10185	7 2 80		48 8.8	123 11.2
10186	7 2 80		48 8.8	123 11.2
10190	7 2 80		48 8.8	123 11.2
10191	7 2 80		48 8.8	123 11.2
10192	7 2 80		48 8.8	123 11.2
10193	7 2 80		48 8.8	123 11.2
10194	7 2 80		48 8.8	123 11.2
10195	7 2 80		48 8.8	123 11.2
10196	7 2 80		48 10.5	123 8.3
10198	7 2 80		48 8.8	123 11.2

Appendix B.10. Dates, times, and positions of the release (launch) and recoveries of drift cards numbered 10200-10299.

DRIFT CARDS	DATE	TIME	LATITUDE (DEG N)	LONGITUDE (DEG W)
LAUNCH	7 1 80	1246	48 8.3	123 25.0
10201	7 27 80		48 10.1	123 56.5
10204	7 20 80		48 8.3	123 35.3
10205	7 26 80	1310	48 23.5	123 56.6
10208	7 8 80		48 10.6	123 8.0
10210	8 13 80		48 19.9	124 29.1
10213	7 8 80		48 9.8	123 10.1
10214	7 26 80		48 17.3	124 21.5
10216	7 25 80		48 8.3	123 35.3
10217	7 9 80		48 8.6	123 34.3
10218	7 12 80		48 8.3	123 35.3
10220	7 4 80		48 8.5	123 24.3
10222	7 23 80	1000	48 8.6	123 34.3
10223	7 16 80		48 9.7	123 42.3
10228	7 8 80		48 10.5	123 8.3
10229	7 4 80		48 10.0	123 9.0
10230	8 9 80	1400	48 25.7	123 27.5
10232	7 20 80		48 9.5	123 45.9
10238	7 7 80		48 9.7	123 44.8
10241	7 8 80		48 9.5	123 43.1
10246	7 6 80		48 9.8	123 9.9
10248	7 8 80		48 9.9	123 9.5
10251	7 28 80	1630	48 8.3	123 35.3
10252	8 1 80		48 9.5	123 43.1
10254	7 9 80		48 10.5	123 8.3
10255	7 9 80	1330	48 9.8	123 44.0
10256	7 7 80	1830	48 9.5	123 43.1
10257	7 8 80	1600	48 15.7	124 15.1
10259	9 22 80		48 25.4	123 23.0
10267	7 25 80		48 34.8	123 .5
10268	7 4 80	1400	48 8.5	123 24.3
10269	7 20 80		48 6.0	122 41.3
10271	7 27 80	1200	48 10.5	124 1.7
10273	7 26 80		48 10.1	123 57.9
10274	8 7 80		48 8.6	123 34.3
10279	7 8 80		48 10.6	123 8.0
10280	8 22 80	0900	48 9.3	123 44.5
10285	7 8 80		48 9.9	123 9.5
10287	7 3 80	1730	48 9.8	123 9.9
10297	7 8 80		48 23.8	123 59.0

Appendix B.11. Dates, times, and positions of the release (launch) and recoveries of drift cards numbered 10300-10399.

DRIFT CARDS	DATE	TIME	LATITUDE (DEG N)	LONGITUDE (DEG W)
LAUNCH	7 1 80	1248	48 7.9	123 26.7
10300	7 4 80	1330	48 10.6	123 8.1
10301	7 8 80		48 9.9	123 9.5
10303	7 4 80		48 10.0	123 9.0
10304	7 4 80	1530	48 8.8	123 15.3
10305	7 13 80		48 22.0	123 45.4
10308	7 7 80	1400	48 10.9	123 6.8
10310	8 22 80		48 34.9	123 .2
10312	7 11 80	1200	48 8.5	123 25.3
10313	7 17 80	1800	48 13.3	124 7.8
10317	7 12 80		48 8.3	123 35.3
10320	7 12 80		48 8.6	123 34.3
10324	7 5 80		48 8.5	123 27.2
10326	7 7 80	1100	48 9.9	123 9.5
10329	7 22 80		48 20.5	123 42.7
10331	8 3 80		48 8.8	123 11.2
10334	9 15 80		48 16.3	124 18.6
10336	7 6 80	1435	48 9.8	123 44.0
10339	7 7 80	1400	48 10.9	123 6.8
10340	7 8 80		48 10.6	123 8.8
10342	7 20 80		48 10.5	123 8.3
10345	7 8 80		48 10.6	123 8.0
10347	7 12 80		48 10.6	123 43.7
10348	7 4 80	0936	48 9.7	123 44.8
10349	7 23 80		48 20.4	124 40.1
10350	7 23 80		48 8.5	123 25.3
10351	8 11 80	0930	48 9.8	123 44.0
10354	8 7 80		47 4.0	124 10.0
10363	7 8 80		48 9.9	123 9.5
10364	7 5 80		48 9.7	123 44.8
10369	7 14 80	1000	48 18.3	124 25.4
10373	7 8 80		48 9.9	123 9.5
10374	7 30 80	1845	48 27.2	122 58.0
10377	7 15 80		48 25.5	123 25.3
10378	8 15 80		46 48.0	124 6.0
10387	7 9 80	1330	48 9.8	123 44.0
10389	7 16 80		48 17.1	124 22.8
10391	7 6 80		48 22.0	123 45.4
10394	7 6 80		48 9.8	123 9.9
10396	7 11 80	1200	48 8.5	123 25.3

Appendix B.12. Dates, times, and positions of the release (launch) and recoveries of drift cards numbered 10400-10499.

DRIFT CARDS	DATE	TIME	LATITUDE (DEG N)	LONGITUDE (DEG W)
LAUNCH	7 1 80	1301	48 5.9	123 2.4
10400	8 8 80		48 10.6	123 8.0
10401	8 7 80		48 8.6	123 34.3
10404	8 25 80		48 10.8	123 38.6
10406	7 11 80	1200	48 8.5	123 25.3
10407	8 16 80	1330	48 22.2	124 34.9
10412	7 8 80		48 10.6	123 8.0
10413	8 17 80	1100	48 08.5	124 10.3
10417	7 7 80		48 9.8	123 9.9
10418	7 8 80		48 10.6	123 8.7
10420	7 25 80		48 8.6	123 34.3
10424	7 8 80		48 9.9	123 9.5
10428	8 6 80		46 59.0	124 10.0
10435	7 5 80		48 10.5	123 8.3
10441	7 8 80		48 8.8	123 11.2
10443	7 23 80		48 17.3	124 21.5
10445	7 8 80		48 9.9	123 9.5
10446	8 13 80	1400	48 7.7	124 42.5
10447	7 7 80		48 9.5	123 43.1
10449	7 13 80		48 10.5	123 8.3
10450	7 28 80		48 7.7	122 54.8
10451	7 6 80		48 10.9	123 6.8
10453	7 28 80		48 7.7	122 54.8
10454	7 28 80		48 7.7	122 54.8
10455	7 4 80		48 10.2	123 9.6
10458	7 31 80		48 5.7	122 54.9
10465	7 29 80		48 8.3	123 35.3
10466	7 28 80		48 7.6	123 13.0
10467	7 30 80		48 10.9	123 6.8
10468	7 9 80		48 15.2	124 16.3
10469	7 28 80		48 7.7	122 54.8
10471	7 28 80		48 7.7	122 54.8
10479	7 28 80		48 29.6	122 56.5
10482	7 13 80		48 22.7	123 40.3
10484	7 4 80		48 10.2	123 9.6
10490	7 3 80	1300	48 5.5	122 52.7
10492	7 11 80	1200	48 27.0	122 54.8
10493	7 13 80		48 10.5	123 8.3
10494	7 8 80		48 8.5	123 11.6
10495	7 8 80		48 9.9	123 9.5
10497	8 8 80	1100	47 50.9	124 32.0

Appendix B.13. Dates, times, and positions of the release (launch) and recoveries of drift cards numbered 10500-10599.

DRIFT CARDS	DATE	TIME	LATITUDE (DEG N)	LONGITUDE (DEG W)
LAUNCH	7 1 80	1303	48 6.3	122 58.7
10501	8 10 80		48 18.0	124 39.8
10507	7 23 80		48 8.5	123 25.3
10517	7 6 80		48 23.5	123 56.6
10518	7 7 80	1400	48 10.9	123 6.8
10520	7 4 80		48 10.2	123 9.6
10523	7 21 80		48 22.0	123 45.4
10525	7 4 80		48 10.0	123 9.0
10526	7 13 80	1400	48 19.0	123 39.2
10528	7 9 80		48 5.7	122 54.9
10534	7 18 80		48 7.7	122 54.8
10538	8 2 80		48 27.4	122 59.8
10539	7 30 80		48 10.7	124 43.1
10540	7 10 80	1815	48 15.2	124 16.3
10542	7 8 80		48 9.6	123 10.4
10545	7 4 80	1330	48 10.6	123 8.1
10552	7 8 80		48 10.9	123 8.6
10553	7 22 80		48 9.8	123 44.0
10557	7 4 80		48 10.9	123 9.0
10564	7 11 80	1200	48 6.5	123 23.5
10565	7 4 80	1330	48 10.6	123 8.1
10566	8 3 80	1500	48 13.3	124 6.7
10569	7 7 80	1200	48 10.0	123 43.7
10570	7 9 80		48 15.8	124 14.8
10571	7 21 80		48 22.0	123 45.4
10574	7 22 80	1600	48 9.5	123 45.9
10576	7 6 80		48 7.3	123 25.8
10585	7 5 80		48 24.5	123 20.5
10591	7 8 80		48 9.9	123 9.5
10598	7 12 80		48 8.6	123 34.3

Appendix B.14. Dates, times, and positions of the release (launch) and recoveries of drift cards numbered 10600-10699.

DRIFT CARDS	DATE	TIME	LATITUDE (DEG N)	LONGITUDE (DEG W)
LAUNCH	7 1 80	1305	48 6.7	122 55.2
10600	7 15 80		48 9.8	123 9.9
10601	7 4 80		48 9.5	123 43.1
10603	8 9 80		48 16.3	124 18.6
10606	7 5 80	0930	48 9.5	123 43.1
10607	7 8 80		48 9.9	123 9.5
10610	7 6 80	1600	48 9.8	123 44.0
10611	7 24 80	1400	48 10.8	123 6.8
10618	7 8 80		48 10.6	123 8.0
10619	7 29 80		48 22.2	124 34.9
10620	7 4 80	1330	48 10.6	123 8.1
10623	7 23 80		48 15.2	124 16.3
10626	7 20 80		48 8.3	123 35.3
10627	8 9 80		48 9.5	122 40.8
10629	7 8 80		48 9.8	123 9.9
10630	7 8 80	1200	48 9.8	123 9.9
10634	7 7 80	1100	48 23.5	123 57.6
10642	7 7 80	1400	48 10.9	123 6.8
10647	7 4 80	1330	48 10.6	123 8.1
10649	7 10 80		48 9.7	123 44.8
10650	7 29 80	1930	48 1.3	122 35.5
10651	7 5 80		48 10.7	123 7.9
10656	9 15 80		48 16.3	124 18.6
10660	7 30 80		48 42.7	125 .8
10664	7 6 80		48 24.5	123 20.5
10668	7 23 80		48 8.5	123 25.3
10674	7 4 80		48 10.2	123 9.6
10675	7 26 80		48 20.5	123 42.7
10677	7 3 80		48 4.6	122 36.5
10680	8 8 80		48 7.1	123 20.8
10681	7 31 80		48 55.4	123 43.0
10686	7 5 80	1330	48 9.5	123 43.1
10687	8 3 80	1100	48 18.0	124 39.8
10690	7 9 80		48 15.8	124 14.8
10692	8 18 80		48 10.5	124 1.7
10698	7 7 80		48 22.0	123 45.4
10699	8 16 80		48 59.0	124 10.0

Appendix B.15. Dates, times, and positions of the release (launch) and recoveries of drift cards numbered 10700-10799.

DRIFT CARDS	DATE	TIME	LATITUDE (DEG N)	LONGITUDE (DEG W)
LAUNCH	7 1 80	1313	48 9.0	122 51.4
10700	7 9 80	1700	48 24.2	123 20.9
10703	8 7 80		48 20.1	123 36.5
10705	7 6 80		48 26.4	123 25.7
10706	7 4 80		48 11.7	122 42.9
10708	8 20 80		48 16.9	124 20.7
10717	7 8 80		48 13.7	122 46.2
10722	9 13 80	1300	48 10.9	123 6.8
10723	7 13 80		48 13.0	124 6.1
10725	7 14 80	1400	48 24.2	123 20.8
10726	7 8 80		48 10.1	123 9.5
10729	8 9 80		48 32.6	123 1.0
10730	7 8 80		48 26.0	123 26.0
10732	7 13 80		48 22.0	123 45.4
10733	7 24 80	1400	48 10.8	123 6.8
10734	7 7 80		48 25.2	123 23.1
10735	8 26 80		48 30.6	122 52.1
10740	7 27 80		48 10.5	123 8.3
10741	7 3 80		48 12.8	122 45.3
10743	7 5 80		48 26.0	123 26.8
10752	7 4 80		48 10.8	122 41.3
10753	7 25 80		48 12.8	122 45.3
10756	7 7 80		48 25.1	123 28.2
10758	7 20 80		48 16.9	124 20.7
10761	8 2 80		46 48.8	124 6.0
10763	8 18 80		48 24.5	123 22.2
10764	7 3 80		48 9.5	122 40.8
10765	7 3 80		48 9.8	122 37.8
10769	7 7 80		48 26.0	123 26.0
10776	7 15 80		48 24.4	123 19.2
10778	8 3 80		46 54.0	124 7.9
10782	7 3 80		48 9.8	122 37.8
10783	7 13 80		48 29.7	122 51.9
10793	7 6 80	1030	48 25.8	123 27.0
10797	7 3 80		48 9.8	122 37.8
10799	7 8 80		48 24.7	123 22.7

Appendix B.16. Dates, times, and positions of the release (launch) and recoveries of drift cards numbered 10800-10899.

DRIFT CARDS	DATE	TIME	LATITUDE (DEG N)	LONGITUDE (DEG W)
LAUNCH	7 1 80	1313	48 11.3	122 49.6
10805	7 26 80	0800	48 9.3	122 36.5
10807	7 10 80		48 24.8	123 18.6
10808	7 5 80		48 24.3	123 21.0
10809	7 8 80		48 24.9	123 23.1
10810	7 3 80		48 9.8	122 37.8
10814	8 26 80		48 7.5	124 42.5
10815	9 3 80		48 11.8	122 43.0
10817	7 22 80		48 20.5	123 42.7
10820	8 9 80		48 24.2	123 18.2
10825	7 23 80		48 15.7	124 17.9
10833	8 5 80		48 26.1	123 18.1
10837	7 24 80	1400	48 10.8	123 6.8
10838	7 3 80		47 58.2	122 32.7
10843	8 12 80		48 13.0	124 6.1
10844	7 3 80		47 58.2	122 32.7
10846	8 7 80		48 8.6	123 34.3
10847	7 23 80		48 25.3	123 24.6
10848	7 15 80		48 22.0	123 45.4
10854	7 3 80		48 9.8	122 37.8
10855	7 28 80		48 15.9	124 40.8
10857	7 21 80		48 25.3	123 24.6
10860	8 25 80		48 19.5	124 28.0
10862	7 10 80	1145	48 24.5	123 22.2
10863	8 6 80		48 27.4	123 .6
10865	7 3 80		47 58.2	122 32.7
10869	7 5 80	1550	48 9.7	122 37.3
10871	7 8 80	0830	48 9.7	122 37.3
10880	7 17 80		48 25.3	123 24.6
10881	7 16 80	1630	48 9.7	122 37.3
10882	7 3 80		48 9.8	122 37.8
10889	7 28 80		48 35.8	123 1.4
10890	8 6 80		48 9.3	122 36.6
10891	7 6 80	1030	48 25.8	123 27.0
10892	8 12 80		48 8.6	123 34.3
10893	7 12 80		48 24.8	123 23.4
10894	7 4 80		48 9.5	122 40.8
10897	7 27 80		48 24.5	123 19.9

Appendix B.17. Dates, times, and positions of the release (launch) and recoveries of drift cards numbered 10900-10999.

DRIFT CARDS	DATE	TIME	LATITUDE (DEG N)	LONGITUDE (DEG W)
LAUNCH	7 1 80	1318	48 13.2	122 46.9
10900	7 4 80	1930	48 6.0	122 41.3
10901	7 22 80		48 32.7	123 .7
10903	7 16 80		48 25.3	123 24.6
10916	8 14 80		48 9.8	123 9.9
10918	7 26 80		48 15.9	124 40.8
10919	9 10 80		48 29.1	123 5.8
10921	7 3 80		48 9.8	122 38.2
10923	7 14 80		48 34.8	123 .5
10924	7 14 80		48 34.8	123 .5
10925	7 31 80		48 8.3	123 35.3
10927	7 12 80	1400	48 25.5	123 17.9
10932	7 3 80		48 9.5	122 40.8
10939	7 19 80		48 8.3	123 27.8
10941	7 2 80	1230	48 11.7	122 42.9
10942	7 21 80		48 27.0	122 54.8
10946	7 5 80		48 10.5	123 25.5
10948	7 3 80		48 12.8	122 45.3
10950	7 19 80		48 33.1	122 55.0
10953	7 3 80		48 9.8	122 37.8
10959	7 11 80	0630	48 9.8	123 44.0
10960	8 3 80		48 31.6	122 51.7
10961	8 24 80		48 38.0	124 47.0
10962	7 3 80		48 9.8	122 37.8
10963	7 13 80		48 29.7	122 51.9
10966	7 12 80	1300	48 25.7	123 27.5
10969	7 8 80		48 26.7	122 52.5
10971	7 30 80		48 10.5	123 8.3
10972	7 3 80		48 12.8	122 45.3
10973	8 19 80		46 58.5	124 10.0
10984	7 24 80		48 26.1	123 18.1
10987	7 3 80		48 9.8	122 38.2
10988	7 29 80		48 30.7	123 1.0
10989	7 18 80		48 16.3	124 18.6
10990	7 4 80		48 12.7	122 45.0
10992	7 20 80		48 26.9	123 26.9
10994	7 8 80	1700	48 24.2	123 20.9
10995	9 7 80		48 29.0	123 4.5
10997	7 2 80	1600	48 11.7	122 42.9
10998	7 13 80	1000	48 33.8	122 53.5
10999	7 15 80	1000	48 29.0	123 .4

Appendix B.18. Dates, times, and positions of the release (launch) and recoveries of drift cards numbered 11000-11099.

DRIFT CARDS	DATE	TIME	LATITUDE (DEG N)	LONGITUDE (DEG W)
LAUNCH	7 1 80	1326	48 .7	122 43.0
11006	7 9 80		48 10.7	123 7.9
11012	7 27 80		48 37.6	123 1.8
11016	7 3 80		48 9.8	122 37.8
11017	7 16 80		48 29.1	123 5.0
11018	7 8 80		48 10.0	123 9.6
11021	7 3 80		47 56.7	122 40.9
11022	7 3 80		48 1.4	122 43.5
11026	7 3 80		48 1.4	122 43.5
11027	7 3 80		48 1.4	122 43.5
11034	7 3 80	1100	48 3.3	122 40.9
11036	7 4 80		48 5.8	122 41.5
11037	7 4 80	1930	48 6.0	122 41.3
11038	7 4 80		48 4.7	122 47.3
11044	7 3 80		48 9.8	122 37.8
11049	7 4 80	1930	48 6.0	122 41.3
11053	7 9 80	1900	48 1.8	122 44.4
11056	8 4 80	1000	48 6.3	122 46.6
11057	7 3 80		48 12.8	122 45.3
11058	7 6 80	1500	48 1.7	122 44.7
11060	7 3 80		47 56.7	122 40.9
11065	7 3 80		48 12.8	122 45.3
11066	7 5 80	1330	48 6.5	122 45.8
11067	7 3 80		48 9.8	122 37.8
11075	7 5 80		48 13.8	122 46.1
11076	8 2 80		48 10.3	123 9.2
11079	7 3 80		48 1.4	122 43.5
11080	7 16 80		48 43.0	122 42.3
11082	7 3 80		48 1.8	122 43.6
11083	7 3 80		48 1.8	122 43.6
11085	7 14 80		48 1.8	122 36.3
11086	7 3 80		48 1.4	122 43.5
11087	7 23 80	1300	48 32.0	122 58.0
11088	7 19 80		48 43.3	122 43.0
11089	7 3 80	1130	48 3.3	122 40.9
11091	7 3 80		47 56.7	122 40.9
11093	7 24 80	1100	48 8.3	123 11.7
11095	7 28 80		48 1.4	122 43.5
11097	7 4 80	1930	48 11.7	122 42.9
11099	7 3 80	1100	48 3.3	122 40.9

Appendix B.19. Dates, times, and positions of the release (launch) and recoveries of drift cards numbered 11100-11199.

DRIFT CARDS	DATE	TIME	LATITUDE (DEG N)	LONGITUDE (DEG W)
LAUNCH	7 1 80	1328	48 .9	122 42.3
11100	7 4 80		48 8.3	122 48.9
11101	7 3 80		48 9.8	122 38.2
11103	7 5 80		48 6.0	122 41.3
11105	7 25 80		48 5.5	122 43.9
11107	7 4 80		48 1.4	122 43.5
11108	7 3 80		48 12.8	122 45.3
11112	7 4 80	1930	48 6.0	122 41.3
11113	8 13 80		48 27.5	122 56.1
11114	7 11 80		48 22.7	123 41.4
11118	7 3 80		48 9.8	122 37.8
11119	7 26 80		48 21.3	123 43.7
11121	7 13 80		48 24.9	123 22.9
11122	7 3 80		48 9.8	122 37.8
11123	7 25 80		48 8.6	123 34.3
11126	7 3 80		48 9.8	122 37.8
11131	7 3 80		48 1.8	122 43.6
11132	7 4 80	1200	48 1.1	122 42.0
11133	7 9 80		48 25.3	123 25.0
11139	7 3 80		48 1.8	122 43.6
11143	7 3 80		48 9.8	122 37.8
11147	7 28 80		48 29.1	123 5.8
11148	7 22 80		48 6.0	122 41.2
1114	7 11 80		48 22.7	123 41.4
11150	7 3 80		48 11.8	122 43.0
11151	7 23 80		48 26.0	123 29.9
11154	7 3 80		48 12.8	122 45.3
11158	7 4 80	1000	48 10.5	122 41.0
11162	7 23 80		48 8.6	123 34.3
11167	7 21 80		48 27.7	123 2.3
11169	7 3 80		48 1.8	122 43.6
11170	7 3 80		48 1.8	122 43.6
11175	7 10 80		48 9.8	122 38.7
11176	7 20 80		48 27.0	122 53.5
11181	7 25 80		48 8.6	123 34.3
11186	7 3 80		48 9.8	122 37.8
11188	7 19 80		48 24.9	123 22.9
11191	7 3 80		48 9.8	122 37.8
11194	7 3 80		48 1.8	122 43.6
11195	7 3 80	1100	48 3.3	122 40.9
11196	7 21 80		48 25.3	123 25.0
111..	7 25 80	1400	48 9.5	123 43.1

Appendix B.20. Dates, times, and positions of the release (launch) and recoveries of drift cards numbered 11200-11299.

DRIFT CARDS	DATE	TIME	LATITUDE (DEG N)	LONGITUDE (DEG W)
LAUNCH	7 1 80	1332	48 1.3	122 39.0
11222	7 3 80		47 56.7	122 40.9
11226	7 4 80	1930	48 6.0	122 41.3
11227	7 26 80		48 9.3	122 36.5
11229	7 3 80		48 9.8	122 37.8
11232	8 3 80		48 33.5	122 55.7
11234	8 3 80		46 54.0	124 7.9
11235	7 12 80		48 8.3	123 35.3
11236	7 24 80		48 10.8	123 6.8
11237	7 26 80		48 11.7	122 42.9
11241	7 3 80		48 1.4	122 43.5
11243	7 20 80		48 24.2	123 18.2
11244	7 23 80		48 9.6	122 37.2
11245	7 24 80		48 10.8	123 6.8
11248	7 14 80		48 11.8	122 43.3
11249	7 3 80	0800	48 8.3	122 36.1
11250	8 18 80		48 11.2	123 6.6
11251	7 7 80		48 9.8	122 38.1
11256	7 3 80		48 9.8	122 37.8
11257	8 22 80		48 35.5	122 53.0
11259	7 7 80		48 1.2	122 42.1
11260	7 3 80		48 9.8	122 37.8
11264	7 23 80		48 8.6	123 34.3
11268	7 3 80		48 9.8	122 38.2
11275	7 13 80		48 10.5	123 8.3
11276	7 26 80		48 10.8	123 6.8
11279	7 3 80		48 9.8	122 37.8
11280	7 30 80		48 24.5	123 20.7
11281	7 3 80		48 9.8	122 37.8
11283	8 30 80		48 8.5	123 25.8
11288	7 3 80		47 56.7	122 40.9
11289	7 3 80		48 9.8	122 37.8
11292	7 3 80		48 11.8	122 43.0
11294	7 23 80		48 8.4	124 42.7
11297	7 24 80		48 26.1	123 18.1
11298	9 2 80		48 24.5	123 19.1
11299	9 2 80		48 24.5	123 19.1

Appendix B.21. Dates, times, and positions of the release (launch) and recoveries of drift cards numbered 11300-11399.

DRIFT CARDS	DATE	TIME	LATITUDE (DEG N)	LONGITUDE (DEG W)
LAUNCH	7 1 80	1333	48 1.4	122 37.9
11301	7 9 80		48 24.5	124 20.7
11303	7 5 80		48 9.6	122 39.8
11305	8 20 80		48 6.0	122 41.2
11306	7 2 80		48 4.6	122 36.5
11307	7 7 80	1400	48 24.2	123 20.9
11312	7 3 80	1100	48 3.3	122 40.9
11319	8 7 80		48 24.9	123 22.9
11321	8 4 80		48 15.8	124 14.8
11322	7 3 80		47 56.7	122 40.9
11325	7 3 80	1000	47 58.2	122 32.7
11326	7 20 80		48 27.0	122 53.5
11327	7 10 80		48 9.5	122 40.8
11329	7 1 80		48 25.6	123 25.5
11333	7 9 80		48 13.7	122 46.2
11335	7 3 80	1000	47 58.2	122 32.7
11336	7 24 80		48 32.1	122 51.3
11337	9 9 80		48 15.5	124 40.8
11339	7 19 80		48 29.5	123 4.0
11344	7 2 80		48 9.6	122 39.8
11345	7 4 80		47 55.2	122 35.7
11347	7 20 80		48 56.2	122 45.0
11352	7 3 80		48 9.8	122 37.8
11353	7 3 80		48 4.6	122 36.5
11354	7 4 80		48 1.4	122 43.5
11356	7 20 80		48 24.9	123 22.9
11360	7 4 80	1235	48 11.8	122 43.3
11364	7 4 80	1930	48 6.0	122 41.3
11365	8 6 80		48 24.7	123 23.0
11368	7 4 80		48 .6	122 41.1
11372	8 21 80		48 21.3	123 43.7
11373	7 6 80		48 29.1	123 5.0
11375	7 3 80		48 9.8	122 37.8
11377	7 9 80		48 25.3	123 25.0
11378	7 30 80		48 25.0	123 23.3
11381	7 26 80		48 9.8	123 44.0
11386			48 25.2	123 24.0
11393	7 15 80		48 32.9	123 9.7
11394	7 9 80		48 25.3	123 24.8
11395	7 10 80		48 25.3	123 24.6
11396	7 6 80		48 31.5	122 54.8
11397	7 4 80	1930	48 6.0	122 41.3
11398	7 3 80		48 9.8	122 37.8

Appendix B.22. Dates, times, and positions of the release (launch) and recoveries of drift cards numbered 11400-11499.

DRIFT CARDS	DATE	TIME	LATITUDE (DEG N)	LONGITUDE (DEG W)
LAUNCH	7 1 80	1334	48 1.5	122 36.6
11401	7 3 80		47 58.3	122 40.8
11404	7 3 80		48 12.8	122 45.3
11405	7 3 80	1000	48 9.8	122 38.2
11410	7 3 80		48 1.8	122 43.6
11411	8 2 80		47 58.2	122 40.8
11412	7 3 80		48 9.8	122 37.8
11413	7 5 80	1300	48 25.9	122 52.2
11414	7 9 80		48 31.7	122 37.7
11418	7 8 80		48 3.5	122 46.2
11419	7 3 80	1000	47 58.2	122 32.7
11422	7 3 80		48 1.4	122 43.5
11423	7 13 80		48 9.5	122 40.8
11424	7 3 80		47 56.7	122 40.9
11425	7 15 80		48 9.6	122 39.8
11427	8 12 80		48 27.4	123 1.2
11428	7 4 80		47 55.4	122 36.3
11433	7 14 80		48 24.9	122 49.7
11435	7 3 80		48 1.8	122 43.6
11438	7 3 80		48 12.8	122 45.3
11443	7 3 80		48 12.8	122 45.3
11445	7 10 80		48 34.8	123 .5
11447	7 3 80		48 1.4	122 43.5
11452	7 24 80		48 22.1	123 46.8
11456	7 6 80		48 11.8	122 43.3
11458	7 2 80		48 9.6	122 39.8
11461	7 25 80		48 8.6	123 34.3
11464	7 9 80		48 25.3	123 25.0
11466	8 9 80		48 27.4	122 59.8
11467	7 5 80	1915	48 25.6	123 22.8
11468	7 3 80		48 9.8	122 37.8
11470	7 7 80	1130	48 25.7	123 27.5
11472	7 3 80		48 9.8	122 37.8
11474	7 23 80		48 6.7	122 35.8
11476	7 3 80		48 11.8	122 43.0
11477	8 3 80		48 8.6	123 34.3
11478	8 1 80		48 26.0	123 26.0
11482	7 3 80		48 9.8	122 37.8
11484	7 3 80		48 12.8	122 45.3
11491	7 13 80		48 24.5	123 20.7
11492	7 3 80	1100	48 3.3	122 40.9

Appendix B.23. Dates, times, and positions of the release (launch) and recoveries of drift cards numbered 11500-11599.

DRIFT CARDS	DATE	TIME	LATITUDE (DEG N)	LONGITUDE (DEG W)
LAUNCH	7 1 80	1353	48 9.4	122 32.9
11502	7 1 80		48 8.1	122 30.6
11504	7 2 80		48 14.9	122 3[illegible]
11507	7 3 80	1100	48 11.6	122 [illegible]
11509	7 16 80		47 49.8	122 [illegible]
11510	7 1 80		48 8.1	122 30.6
11511	7 1 80		48 8.1	122 30.6
11512	7 1 80		48 8.1	122 30.6
11513	7 3 80	1100	48 11.6	122 28.2
11514	7 1 80		48 8.1	122 30.6
11516	7 1 80		48 8.1	122 30.6
11524	7 1 80		48 8.1	122 30.6
11526	8 31 80		48 14.2	122 26.0
11527	7 3 80		48 7.4	122 29.5
11528	7 3 80	1100	48 11.6	122 28.2
11530	7 4 80		48 11.7	122 27.7
11531	7 5 80		48 11.0	122 28.6
11532	7 4 80		48 7.7	122 28.1
11533	7 1 80		48 8.1	122 30.6
11534	7 1 80		48 8.1	122 30.6
11536	7 3 80		48 5.7	122 24.8
11537	7 1 80		48 8.1	122 30.6
11539	7 3 80	1100	48 11.6	122 28.2
11540	7 3 80	1100	48 11.6	122 28.2
11542	7 3 80		48 11.6	122 28.2
11543	7 3 80	1500	48 12.1	122 26.9
11544	7 3 80	1930	48 11.6	122 28.2
11545	7 5 80		48 3.7	122 23.1
11546	7 1 80		48 8.1	122 30.6
11547	7 5 80		48 11.6	122 28.2
11548	7 4 80		48 7.7	122 28.1
11549	7 5 80	1600	48 10.3	122 31.6
11550	7 1 80		48 8.1	122 30.6
11553	8 2 80	1800	48 12.1	122 26.9
11554	7 14 80	1000	48 9.7	122 37.3
11555	7 8 80		47 54.8	122 31.7
11556	7 5 80		48 14.8	122 39.3
11557	7 4 80		46 7.7	122 28.1
11558			48 11.6	122 28.2
11559	7 3 80	1100	48 11.6	122 28.2
11560	8 18 80	1500	48 11.7	122 27.7
11563	7 2 80		48 9.5	122 40.8
11567	7 3 80	1500	48 12.1	122 26.9
11568	7 3 80		48 5.7	122 24.8
11571	7 10 80	1930	48 9.9	122 28.3
115_5	7 3 80	1100	48 11.6	122 28.2
11576	7 13 80		48 11.1	122 32.2
11578	7 1 80		48 8.1	122 30.6
11580	7 3 80	1100	48 11.6	122 28.2
11581	7 4 80		48 7.7	122 28.1
11582	7 10 80		47 58.0	122 14.2
11584	7 3 80	1100	48 11.6	122 28.2
11589	7 2 80	1400	48 3.3	122 21.3
11590	7 3 80	1500	48 12.1	122 26.9
11592	7 1 80		48 8.1	122 30.6
11594	7 4 80		48 11.6	122 28.2
11597	7 4 80		48 7.7	122 28.1
115_7	7 6 80	1400	47 51.8	122 19.7
115__	7 1 80		48 8.1	122 30.6
115__	7 7 80		48 11.1	122 27.2

Appendix B.24. Dates, times, and positions of the release (launch) and recoveries of drift cards numbered 11600-11699.

DRIFT CARDS	DATE	TIME	LATITUDE (DEG N)	LONGITUDE (DEG W)
LAUNCH	7 1 80	1354	48 9.4	122 34.0
11610	7 4 80	1000	48 11.6	122 28.2
11612	7 5 80		48 13.7	122 24.2
11614	7 4 80		48 7.7	122 28.1
11619	7 5 80	1600	48 5.1	122 23.8
11620	7 2 80	0800	48 .4	122 18.1
11627	7 2 80	0530	48 .3	122 18.1
11631	7 2 80	0600	48 .4	122 18.1
11633	7 23 80		48 9.5	123 43.1
11637	7 2 80	0900	48 .4	122 18.1
11639	7 7 80		48 7.7	122 28.1
11640	7 2 80	0600	48 .4	122 18.1
11648	7 4 80		48 7.7	122 28.1
11651	7 2 80	0538	48 .3	122 18.1
11653	7 5 80		48 11.6	122 28.2
11655	7 2 80	0600	48 .4	122 18.1
11657	7 4 80	1100	48 11.6	122 28.2
11659	7 2 80	0600	48 .4	122 18.1
11660	7 2 80	0600	48 .4	122 18.1
11663	7 4 80	1100	48 11.6	122 28.2
11669	7 2 80	0600	48 .4	122 18.1
11674	7 2 80	0600	48 .4	122 18.1
11682	7 4 80		48 7.7	122 28.1
11683	7 28 80		48 9.8	122 38.2
11684	7 21 80		48 .6	122 19.3
11692	7 4 80	1100	48 11.6	122 28.2
11698	7 4 80		48 1.4	122 22.3

Appendix B.25. Dates, times, and positions of the release (launch) and recoveries of drift cards numbered 11700-11799.

DRIFT CARDS	DATE	TIME	LATITUDE (DEG N)	LONGITUDE (DEG W)
LAUNCH	7 1 80	1358	48 9.5	122 31.8

NO RECOVERIES REPORTED

Appendix B.26. Dates, times, and positions of the release (launch) and recoveries of drift cards numbered 11800-11899.

DRIFT CARDS	DATE	TIME	LATITUDE (DEG N)	LONGITUDE (DEG W)
LAUNCH	7 1 80	1417	48 16.4	122 29.1
11801	7 12 80		48 24.9	122 33.1
11802	8 8 80		48 25.6	122 35.0
11806	7 10 80		48 25.3	122 36.6
11813	7 11 80		48 24.8	122 33.0
11818	7 19 80		48 27.5	122 55.2
11821	7 5 80		48 23.7	122 34.2
11823	7 5 80		48 23.2	122 33.6
11824	7 7 80		48 26.2	122 34.1
11825	8 16 80		48 26.2	122 34.1
11830	7 4 80		48 25.4	122 35.7
11835	7 17 80		48 13.1	122 32.1
11840	7 7 80		48 26.2	122 34.1
11844	7 30 80		48 8.6	123 34.3
11846	7 5 80		48 24.0	122 34.5
11847	7 6 80	1615	48 21.5	122 32.5
11853	7 4 80	1200	48 24.0	122 37.4
11854	7 5 80		48 25.3	122 33.5
11863	7 4 80		48 24.8	122 33.0
11864	8 19 80		48 29.1	122 35.4
11868	7 4 80	1400	48 25.1	122 33.8
11872	7 4 80		48 24.8	122 33.0
11873	7 13 80		48 24.0	122 37.4
11875	7 6 80		48 24.2	122 38.0
11878	8 31 80		48 24.0	122 32.8
11881	7 5 80		48 25.3	122 36.6
11887	7 6 80		48 24.0	122 37.4
11888	7 9 80	0700	48 24.0	122 37.4
11889	7 4 80		48 25.4	122 35.7
11891	7 5 80		48 25.4	122 35.7
11895	8 9 80		48 26.2	122 34.1

Appendix B.27. Dates, times, and positions of the release (launch) and recoveries of drift cards numbered 11900-11999.

DRIFT CARDS	DATE	TIME	LATITUDE (DEG N)	LONGITUDE (DEG W)
LAUNCH	7 1 80	1418	48 16.5	122 30.4
11902	7 5 80		48 21.2	122 34.6
11912	7 4 80		48 25.4	122 35.7
11913	7 5 80		48 14.8	122 39.3
11922	7 5 80		48 23.7	122 34.2
11923	7 5 80		48 23.3	122 34.4
11954	8 9 80		48 26.2	122 34.1
11962	7 6 80	1400	48 14.8	122 39.3
11974	7 6 80	1900	48 24.2	122 38.0
11975	7 6 80		48 26.8	122 33.5
11995	7 4 80		48 23.7	122 34.2

Appendix B.28. Dates, times, and positions of the release (launch) and recoveries of drift cards numbered 12000-12099.

DRIFT CARDS	DATE	TIME	LATITUDE (DEG N)	LONGITUDE (DEG W)
LAUNCH	7 2 80	0716	48 7.8	123 17.3
12003	7 29 80		48 9.6	123 10.3
12006	7 7 80	1830	48 9.5	123 43.1
12009	8 11 80	1500	48 8.6	123 34.3
12010	7 16 80	1400	48 19.9	124 29.1
12012	8 3 80		47 8.8	124 11.0
12013	7 4 80		48 10.0	123 9.0
12016	7 12 80		48 8.3	123 35.3
12018	7 13 80		48 10.5	123 8.3
12020	7 17 80		48 15.7	124 15.1
12022	7 5 80		48 9.5	123 43.1
12031	7 6 80		48 9.5	123 43.1
12036	8 2 80		47 8.8	124 11.0
12043	7 8 80		48 9.4	123 10.7
12044	7 4 80		48 8.5	123 25.7
12050	7 8 80		48 8.3	123 12.0
12056	7 4 80		48 8.5	123 25.7
12057	7 6 80		48 10.3	123 9.2
12065	7 12 80		48 8.3	123 35.3
12066	7 9 80		48 10.9	123 6.8
12068	7 29 80		47 18.8	124 36.3
12069	7 28 80		48 8.6	123 34.3
12074	7 15 80		48 17.3	124 21.5
12081	8 17 80		48 9.6	123 10.3
12083	8 20 80		48 9.5	123 49.6
12085	7 4 80		48 8.0	123 25.7
12087	8 18 80		48 7.1	123 20.8
12090	9 3 80		48 7.5	124 42.5
12091	7 13 80		48 10.5	123 8.3
12092	7 22 80		48 7.8	123 27.5
12096	8 18 80		48 41.4	124 55.5

Appendix B.29. Dates, times, and positions of the release (launch) and recoveries of drift cards numbered 12100-12199.

DRIFT CARDS	DATE	TIME	LATITUDE (DEG N)	LONGITUDE (DEG W)
LAUNCH	7 2 80	0719	48 7.9	123 20.9
12106	7 21 80		48 22.0	123 45.4
12107	7 4 80	1400	48 11.1	123 6.3
12114	7 8 80		48 10.4	123 9.1
12121	8 6 80		48 26.2	123 26.7
12123	- - 80		48 9.5	123 43.1
12124	7 8 80		48 9.9	123 9.5
12125	7 30 80		48 8.6	123 34.3
12127	8 2 80		48 9.5	123 43.1
12130	7 7 80	1400	48 10.9	123 6.8
12131	7 8 80		48 9.2	123 10.8
12132	7 5 80		48 10.3	123 9.2
12133	8 18 80		48 9.5	123 43.1
12134	8 2 80		46 48.8	124 6.0
12138	7 8 80		48 9.9	123 9.5
12139	7 4 80	1330	48 10.6	123 8.1
12140	7 24 80		48 9.5	123 43.1
12141	7 13 80		48 10.5	123 8.3
12142	7 8 80		48 9.9	123 9.5
12146	7 16 80	1400	48 19.9	124 29.1
12150	7 12 80		48 8.6	123 34.3
12156	7 5 80		48 8.4	123 24.2
12163	7 8 80		48 10.6	123 8.0
12169	7 8 80		48 10.4	123 9.1
12172	7 24 80		47 55.3	124 38.8
12173	7 4 80	1330	48 10.6	123 8.1
12174	7 13 80		48 8.5	123 26.7
12175	7 15 80		48 39.4	124 48.7
12181	7 28 80		48 9.3	123 44.5
12182	7 17 80		48 10.3	123 9.2
12183	7 5 80		48 10.3	123 9.2
12185	7 4 80		48 10.9	123 6.8
12189	7 27 80		48 9.4	124 45.0
12194	7 26 80		48 27.0	123 26.9
12196	7 17 80		48 26.0	123 15.4
12198	7 8 80		48 10.6	123 8.0

Appendix B.30. Dates, times, and positions of the release (launch) and recoveries of drift cards numbered 12200-12299.

DRIFT CARDS	DATE	TIME	LATITUDE (DEG N)	LONGITUDE (DEG W)
LAUNCH	7 2 80	0722	48 8.3	123 25.4
12210	7 11 80	1200	48 8.5	123 25.2
12212	7 29 80		48 37.8	124 46.0
12214	8 9 80		48 10.7	124 43.1
12218	7 7 80	1500	48 9.5	123 43.1
12221	8 14 80		48 7.7	124 42.5
12227	7 12 80		48 8.6	123 34.3
12229	7 23 80		48 8.5	123 25.7
12230	7 3 80		48 8.0	123 28.2
12231	7 12 80		48 8.3	123 35.3
12232	7 23 80		48 8.6	123 34.3
12236	8 16 80		48 17.3	124 21.5
12238	8 7 80		48 36.7	124 44.8
12275	7 12 80		48 8.3	123 35.3
12282	7 25 80		48 9.5	122 40.8
12288	7 23 80		48 8.6	123 34.3
12290	7 18 80		48 7.8	123 27.5
12292	8 18 80		46 59.0	124 10.0
12293	7 13 80		48 17.1	124 22.8
12296	7 8 80		48 9.5	123 43.1
12298	7 23 80		48 8.5	123 25.7

Appendix B.31. Dates, times, and positions of the release (launch) and recoveries of drift cards numbered 12300-12399.

DRIFT CARDS	DATE	TIME	LATITUDE (DEG N)	LONGITUDE (DEG W)
LAUNCH	7 2 80	0724	48 7.9	123 26.7
12300	7 3 80		48 8.0	123 25.7
12302	7 13 80		48 8.3	123 26.3
12305	7 26 80		48 11.1	123 6.0
12306	7 13 80		48 10.5	123 8.3
12307	7 9 80		48 15.8	124 14.8
12308	7 13 80		48 10.5	123 8.3
12310	7 6 80		48 9.9	123 9.5
12320	7 8 80		48 10.6	123 8.0
12323	7 6 80		48 10.3	123 9.2
12324	8 19 80		45 28.0	123 58.0
12330	7 12 80	1400	48 10.3	123 9.2
12331	7 8 80		48 9.9	123 9.5
12334	7 3 80		48 8.0	123 25.7
12335	7 7 80		48 9.8	123 9.9
12337	7 3 80		48 8.0	123 25.7
12338	7 7 80		48 9.8	123 9.9
12342	7 7 80		48 9.8	123 9.9
12344	8 13 80		46 29.0	123 .4
12346	7 3 80		48 8.0	123 25.7
12347	7 24 80		47 55.3	124 38.8
12350	7 17 80		48 27.0	122 57.7
12352	7 3 80		48 8.0	123 25.7
12353	8 24 80		46 54.0	124 7.5
12358	7 7 80		48 9.8	123 9.9
12360	9 2 80		48 11.0	123 6.3
12361	7 13 80		48 10.5	123 8.3
12362	7 22 80		48 15.7	124 17.9
12363	7 3 80		48 8.0	123 25.7
12366	7 8 80		48 10.1	123 9.5
12370	9 12 80		48 9.6	123 10.3
12374	7 7 80		48 9.8	123 9.9
12376	7 3 80		48 8.0	123 25.7
12378	7 8 80		48 8.7	123 11.4
12384	7 16 80		48 10.3	123 9.2
12389	7 8 80		48 9.6	123 10.4
12389	7 4 80		48 10.0	123 9.0
12398	7 8 80		48 9.9	123 9.5

Appendix B.32. Dates, times, and positions of the release (launch) and recoveries of drift cards numbered 12400-12499.

DRIFT CARDS	DATE	TIME	LATITUDE (DEG N)	LONGITUDE (DEG W)
LAUNCH	7 2 80	0735	48 5.9	123 2.0
12400	7 13 80		48 10.5	123 8.3
12404	7 9 80		48 9.5	123 43.1
12406	7 9 80		48 8.5	123 25.7
12407	8 3 80		48 8.6	123 34.3
12410	7 6 80		48 10.3	123 9.2
12413	7 7 80		48 9.8	123 44.0
12418	7 5 80		48 9.6	123 10.3
12427	7 8 80		48 9.4	123 10.7
12435	7 23 80		48 8.5	123 25.7
12438	7 9 80		48 8.5	123 25.7
12441	7 8 80		48 10.6	123 8.7
12443	7 26 80		48 5.3	122 55.2
12451	7 28 80		48 10.1	123 57.9
12454	7 8 80		48 10.6	123 8.3
12455	7 25 80		48 8.6	123 34.3
12456	8 1 80		46 52.0	124 7.0
12458	7 7 80		48 23.5	123 57.6
12464	7 5 80	1700	48 9.7	123 43.5
12470	8 2 80		48 7.1	123 20.8
12473	7 23 80		48 8.5	123 25.7
12475	8 8 80		47 55.3	124 38.8
12477	8 9 80		46 52.0	124 7.0
12478	7 18 80		48 19.9	124 29.1
12479	7 8 80		48 9.8	123 44.0
12480	8 18 80		46 59.0	124 10.0
12482	7 6 80		48 10.6	123 8.0
12487	7 28 80		48 8.6	123 34.3
12494	8 31 80		48 13.0	124 41.5
12496	7 31 80		48 7.7	124 42.5
12497	7 8 80		48 10.6	123 8.0
12498	7 4 80		48 10.0	123 9.0
12499	7 24 80		48 5.7	122 54.8

Appendix B.33. Dates, times, and positions of the release (launch) and recoveries of drift cards numbered 12500-12599.

DRIFT CARDS	DATE	TIME	LATITUDE (DEG N)	LONGITUDE (DEG W)
LAUNCH	7 2 80	0738	48 6.3	122 58.3
12502	7 4 80	1330	48 10.6	123 8.1
12510	7 23 80	1000	48 8.6	123 34.3
12515	7 4 80		48 10.0	123 9.0
12516	7 4 80		48 10.2	123 9.6
12517	7 4 80		48 8.8	123 15.3
12518	7 13 80		48 10.5	123 8.3
12520	7 8 80		48 9.9	123 9.5
12525	8 10 80		48 16.5	124 18.1
12526	7 30 80		46 48.8	124 6.0
12530	8 16 80		47 36.0	124 22.2
12533	8 18 80		46 58.5	124 10.0
12535	7 4 80		48 10.2	123 9.6
12537	7 10 80		48 8.5	123 25.7
12540	7 8 80		48 8.6	123 34.3
12553	7 11 80		48 9.5	123 43.1
12559	7 8 80	1000	48 10.6	123 8.0
12566	7 6 80		48 9.8	123 44.0
12568	7 22 80		48 15.7	124 17.9
12569	7 4 80		48 10.0	123 9.0
12571	7 6 80		48 19.0	123 39.2
12573	7 4 80	1400	48 9.7	123 43.5
12584	8 6 80		46 26.0	124 3.3
12588	8 19 80		48 17.3	124 23.6
12592	7 27 80		48 15.9	124 40.8
[illegible]	7 8 80		48 9.9	123 9.5

Appendix B.34. Dates, times, and positions of the release (launch) and recoveries of drift cards numbered 12600-12699.

DRIFT CARDS	DATE	TIME	LATITUDE (DEG N)	LONGITUDE (DEG W)
LAUNCH	7 2 80	0740	48 6.7	122 59.2
12600	7 20 80		48 32.7	123 .7
12605	7 29 80		48 9.6	123 49.3
12606	7 8 80	1000	48 10.6	123 8.0
12607	7 5 80		48 9.5	123 10.3
12608	7 6 80		48 10.3	123 9.2
12610	7 5 80	0615	48 9.5	123 43.1
12613	7 17 80		48 29.1	123 5.0
12614	7 8 80		48 10.6	123 8.7
12616	7 9 80		48 9.8	123 44.0
12617	8 15 80		48 17.3	124 21.5
12618	7 8 80	1000	48 10.6	123 8.0
12622	7 19 80		48 10.9	123 6.8
12627	7 22 80		48 22.0	123 45.4
12628	7 16 80		48 10.3	123 9.2
12629	7 8 80	1500	48 9.9	123 9.5
12630	7 29 80		48 8.6	123 34.3
12631	7 13 80		48 20.0	123 42.3
12632	7 9 80		48 10.3	123 9.2
12633	7 4 80	1330	48 10.6	123 8.1
12636	7 28 80		48 8.6	123 34.3
12637	7 14 80		48 9.8	123 44.0
12639	7 23 80		48 8.5	123 25.7
12646	7 8 80	1000	48 10.6	123 8.0
12651	7 17 80		48 25.3	123 24.6
12652	7 8 80		48 9.9	123 9.5
12657	7 4 80	1600	48 8.5	123 24.7
12660	7 8 80		48 10.1	123 9.5
12662	7 16 80		48 8.6	123 34.3
12663	7 12 80		48 24.5	123 20.6
12664	7 15 80		48 17.3	124 21.5
12669	8 6 80		47 55.3	124 38.8
12672	7 30 80		48 7.0	124 42.5
12692	7 9 80		48 10.9	123 6.8
12698	7 7 80	1400	48 10.9	123 6.8
12699	7 6 80	1730	48 10.9	123 6.8

Appendix B.35. Dates, times, and positions of the release (launch) and recoveries of drift cards numbered 12700-12799.

DRIFT CARDS	DATE	TIME	LATITUDE (DEG N)	LONGITUDE (DEG W)
LAUNCH	7 2 80	0742	48 9.1	122 51.6
12701	7 25 80		48 17.3	124 23.6
12703	7 12 80		48 10.3	123 9.2
12704	7 7 80	1400	48 10.9	123 6.8
12707	7 8 80		48 10.6	123 8.0
12708	7 9 80		48 15.8	124 14.8
12709	7 8 80		48 10.6	123 8.0
12715	7 7 80		48 9.8	123 9.9
12716	7 8 80		48 10.6	123 8.0
12720	7 8 80		48 9.8	123 44.0
12724	7 6 80		48 10.3	123 9.2
12725	7 8 80		48 22.0	123 45.4
12727	7 22 80		48 9.5	123 43.1
12728	7 8 80		48 10.6	123 8.3
12731	7 13 80		48 10.5	123 8.3
12737	7 8 80		48 9.9	123 9.5
12739	7 30 80		48 10.9	123 6.8
12747	7 7 80	1400	48 10.9	123 6.8
12750	7 22 80		48 17.1	124 22.8
12754	7 12 80		48 9.5	123 43.1
12759	8 10 80		48 24.5	123 20.6
12761	7 8 80		48 10.6	123 8.6
12762	8 24 80		46 19.0	124 4.0
12766	7 4 80	1330	48 10.6	123 8.1
12768	7 4 80	1330	48 10.6	123 8.1
12772	7 7 80	1400	48 10.9	123 6.8
12775	7 8 80		48 9.9	123 9.5
12780	7 11 80		48 25.5	123 25.3
12781	7 25 80		48 7.1	123 20.8
12782	7 8 80		48 9.9	123 9.5
12784	7 6 80		48 8.5	123 25.7
12787	7 8 80		48 10.8	123 7.0
12788	7 7 80	1400	48 10.9	123 6.8
12789	8 10 80		48 11.1	123 6.3
12790	7 15 80		48 10.0	123 9.0
12792	8 8 80		48 23.0	124 35.7
12794	7 16 80		48 19.9	124 29.1
12795	7 9 80		48 23.5	123 57.6
12796	9 18 80		48 10.9	123 6.8

Appendix B.36. Dates, times, and positions of the release (launch) and recoveries of drift cards numbered 12800-12899.

DRIFT CARDS	DATE	TIME	LATITUDE (DEG N)	LONGITUDE (DEG W)
LAUNCH	7 2 80	0745	48 11.2	122 49.3
12800	8 4 80		46 20.3	123 26.7
12816	8 4 80		46 19.3	124 3.3
12817	7 5 80	0615	48 9.5	123 43.1
12824	8 28 80		47 56.0	124 38.0
12826	7 23 80		48 15.7	124 17.9
12833	7 12 80		48 8.6	123 34.3
12836	7 15 80		48 24.4	123 21.8
12838	7 13 80		48 17.5	124 24.0
12840	8 4 80		48 19.4	123 38.0
12842	7 22 80		48 26.9	123 26.1
12850	7 5 80	1915	48 25.6	123 22.8
12852	7 20 80		48 9.8	123 44.0
12854	7 9 80	1330	48 9.8	123 44.0
12855	7 8 80		48 10.7	123 8.0
12856	8 13 80		48 10.1	123 56.5
12858	7 20 80		48 21.0	123 42.8
12860	7 12 80		48 25.0	123 24.5
12861	7 28 80		48 23.8	123 59.0
12863	7 9 80		48 8.5	123 25.7
12864	7 9 80	1500	48 9.5	123 43.1
12870	7 28 80		48 11.0	123 6.3
12873	7 12 80	1300	48 25.6	123 27.7
12879	7 22 80		48 24.5	123 21.9
12880	7 6 80		48 8.5	123 25.7
12888	7 11 80	1200	48 8.5	123 25.7
12889	7 23 80	1000	48 8.6	123 34.3
12894	7 11 80	1200	48 8.5	123 25.2
12895	8 2 80		46 48.8	124 6.0

Appendix B.37. Dates, times, and positions of the release (launch) and recoveries of drift cards numbered 12900-12999.

DRIFT CARDS	DATE	TIME	LATITUDE (DEG N)	LONGITUDE (DEG W)
LAUNCH	7 2 80	0749	48 13.0	122 46.9
12902	7 18 80	1000	48 34.2	122 53.3
12905	7 8 80		48 24.5	123 22.2
12906	8 6 80		46 59.0	124 10.0
12907	7 25 80		48 8.6	123 34.3
12908	8 11 80		48 24.3	123 20.9
12909	7 5 80		48 30.7	123 1.0
12911	7 25 80		48 9.8	123 44.0
12914	8 4 80		48 19.4	123 38.0
12916	7 22 80		48 32.9	123 9.7
12919	7 24 80		48 25.3	123 24.6
12924	7 11 80		48 21.4	123 43.5
12925	8 19 80		48 15.7	124 17.9
12926	7 26 80		48 8.7	123 11.2
12928	7 12 80	1700	48 27.4	122 59.8
12930	7 9 80		48 24.8	123 23.4
12932	7 8 80		48 22.7	123 31.2
12935	7 13 80		48 9.5	123 43.1
12937	8 29 80		48 24.2	123 20.9
12941	7 10 80		48 28.5	122 41.4
12946	7 26 80		48 25.7	123 27.5
12949	8 7 80		48 4.6	122 53.4
12951	7 23 80		48 24.2	123 20.8
12956	8 15 80		48 32.7	123 .7
12959	7 25 80		48 9.8	123 44.0
12960	7 6 80		48 26.4	123 25.7
12963	7 15 80		48 39.2	122 41.6
12964	7 21 80	1400	48 25.6	123 27.7
12966	7 9 80		48 25.3	123 24.8
12968	8 21 80		48 38.4	122 58.6
12970	7 3 80		48 9.8	122 37.8
12971	7 22 80		48 22.0	123 45.4
12976	8 8 80		48 27.4	122 59.8
12982	7 14 80		48 34.8	123 .5
12987	8 15 80		48 31.6	122 58.1
12989	7 16 80		48 32.0	122 58.0
12994	7 11 80		48 27.1	123 16.0
12995	7 5 80		48 32.7	123 .7
12996	7 17 80		48 27.0	122 57.7

Appendix B.38. Dates, times, and positions of the release (launch) and recoveries of drift cards numbered 13000-13099.

DRIFT CARDS	DATE	TIME	LATITUDE (DEG N)	LONGITUDE (DEG W)
LAUNCH	7 2 80	0757	48 .8	122 43.1
13004	7 5 80		48 6.7	122 45.4
13005	7 11 80		48 2.0	122 45.0
13011	7 4 80		48 5.7	122 41.5
13014	8 4 80		48 41.5	122 54.7
13015	7 3 80		48 1.8	122 43.6
13016	7 13 80		48 27.4	122 59.8
13017	7 27 80		48 31.7	122 38.8
13018	8 22 80		48 26.7	122 52.6
13024	8 10 80		48 4.9	122 44.3
13035	7 3 80		48 1.8	122 43.6
13048	7 15 80		48 6.7	122 45.4
13050	7 26 80		47 53.3	122 36.6
13052	7 4 80		47 58.2	122 40.8
13053	7 26 80		48 7.3	122 50.6
13055	7 3 80		48 1.8	122 43.6
13056	7 3 80		48 1.8	122 43.6
13059	7 3 80		48 1.8	122 43.6
13062	7 8 80	1930	48 7.5	123 13.3
13064	7 24 80		48 10.8	123 6.8
13066	7 4 80	1930	48 6.0	122 41.3
13069	7 _ 80		48 19.6	123 37.7
13071	7 3 80		48 1.8	122 43.6
13077	7 3 80		48 1.8	122 43.6
13078	7 3 80		48 1.3	122 43.7
13080	7 4 80	1930	48 6.0	122 41.3
13083	7 4 80	1930	48 6.0	122 41.3
13084	7 3 80		48 10.9	123 6.8
13089	7 17 80		48 10.9	123 6.8
13091	7 4 80	1930	48 6.0	122 41.3
13094	7 10 80		48 6.8	122 45.4
13095	7 6 80	1200	48 13.8	122 46.1

Appendix B.39. Dates, times, and positions of the release (launch) and recoveries of drift cards numbered 13100-13199.

DRIFT CARDS	DATE	TIME	LATITUDE (DEG N)	LONGITUDE (DEG W)
LAUNCH	7 2 80	0801	48 .8	122 42.2
13100	7 3 80		48 1.8	122 43.6
13103	7 27 80		48 27.7	123 2.3
13104	7 4 80	1930	48 6.0	122 41.3
13107	7 3 80		48 1.8	122 43.6
13108	7 4 80	1930	48 6.0	122 41.3
13110	7 4 80	1930	48 6.0	122 41.3
13113	7 3 80		48 1.8	122 43.6
13114	8 4 80	0730	48 41.5	122 54.7
13118	7 4 80	1930	48 6.0	122 41.3
13119	7 3 80		48 1.8	122 43.6
13120	7 3 80		48 1.8	122 43.6
13121	7 3 80		48 1.8	122 43.6
13127	7 5 80		48 1.7	122 43.7
13128	7 3 80		48 1.8	122 43.6
13129	7 3 80		48 1.8	122 43.6
13130	7 3 80		48 1.8	122 43.6
13131	7 3 80		48 1.8	122 43.6
13132	7 8 80		48 5.2	122 48.0
13136	7 3 80		48 1.8	122 43.6
13137	7 3 80		48 1.8	122 43.6
13138	7 3 80		48 1.8	122 43.6
13140	7 3 80		48 1.8	122 43.6
13141	7 10 80		48 6.7	122 45.4
13142	7 3 80		48 1.8	122 43.6
13144	7 3 80		48 1.8	122 43.6
13148	7 3 80		48 1.8	122 43.6
13149	7 4 80	1930	48 6.0	122 41.3
13150	7 3 80		48 1.8	122 43.6
13151	7 20 80		48 27.0	122 53.5
13158	7 3 80		48 11.8	122 43.0
13159	7 9 80	1900	48 1.8	122 44.4
13161	7 3 80		48 1.8	122 43.6
13167	7 4 80	1930	48 6.0	122 41.3
13168	7 5 80	1615	48 6.0	122 41.3
13169	7 3 80		48 1.8	122 43.6
13170	7 3 80		48 1.8	122 43.6
13172	7 2 80		47 59.7	122 43.1
13173	7 4 80		48 4.6	122 47.3
13174	7 3 80		48 1.8	122 43.6
13177	7 3 80		48 1.8	122 43.6
13178	7 9 80	2030	48 3.5	122 45.9
13180	7 3 80		48 1.8	122 43.6
13184	7 29 80		48 8.3	123 35.3
13187	7 3 80		48 1.8	122 43.6
13188	7 3 80		48 1.8	122 43.6
13189	7 4 80	1930	48 6.0	122 41.3
13190	7 3 80		48 1.8	122 43.6
13194	8 3 80		48 34.6	122 59.6
13195	7 12 80		48 32.2	122 51.0
13196	7 15 80		48 31.2	123 .8
13197	7 4 80		48 11.9	122 43.7
13199	7 4 80	1930	48 6.0	122 41.3

Appendix B.40. Dates, times, and positions of the release (launch) and recoveries of drift cards numbered 13200-13299.

DRIFT CARDS	DATE	TIME	LATITUDE (DEG N)	LONGITUDE (DEG W)
LAUNCH	7 2 80	0809	48 1.3	122 39.1
13200	7 3 80		48 9.8	122 37.8
13204	7 13 80		48 9.7	122 34.3
13205	7 3 80		48 9.8	122 37.8
13206	7 25 80		48 8.8	123 34.3
13208	7 3 80	1000	48 9.3	122 40.7
13211	7 5 80		48 26.9	123 26.9
13214	7 3 80		48 9.8	122 37.8
13217	7 3 80		48 9.8	122 37.8
13218	7 14 80		48 34.8	123 .5
13219	7 17 80		48 23.8	123 19.4
13220	7 26 80		48 8.3	123 35.3
13222	7 29 80		48 25.1	123 24.3
13226	7 3 80		48 9.8	122 37.8
13227	7 17 80		48 29.3	123 4.4
13229	8 24 80		48 8.5	123 25.2
13238	7 29 80		48 9.8	122 37.8
13240	7 3 80		48 9.8	122 37.8
13241	7 26 80		48 10.2	124 44.0
13243	7 9 80		48 25.3	123 25.0
13244	7 5 80		48 24.3	123 21.0
13245	7 3 80		48 9.8	122 37.8
13247	7 7 80	1130	48 25.8	123 27.3
13250	8 3 80		48 8.8	123 34.3
13256	7 5 80		48 26.0	123 15.4
13257	7 3 80		48 9.8	122 37.8
13258	7 4 80		48 9.5	122 40.8
13259	7 3 80		48 12.8	122 45.3
13260	7 30 80		48 10.9	123 8.8
13261	7 3 80		48 9.8	122 37.8
13263	7 3 80		48 9.8	122 37.8
13266	7 3 80		48 9.8	122 37.8
13268	7 26 80		48 27.0	122 57.0
13269	7 16 80		48 10.3	123 9.2
13271	7 3 80		48 9.8	122 37.8
13272	8 20 80		48 26.7	122 52.8
13274	7 3 80		48 9.8	122 37.8
13276	7 12 80		48 8.3	123 35.3
13277	8 11 80		48 25.8	123 27.3
13278	7 17 80		48 27.0	122 57.7
13280	7 23 80		48 32.0	122 58.0
13281	7 3 80		48 12.8	122 45.3
13283	7 3 80		48 12.8	122 45.3
13284	7 13 80		48 29.7	122 51.9
13286	7 8 80		48 24.2	123 20.8
13288	7 31 80		48 9.5	122 40.8
13290	7 8 80		48 25.8	123 27.3
13294	7 9 80		48 24.6	123 22.5
13297	7 3 80		48 9.8	122 37.8
13298	7 11 80		48 34.8	123 .5

Appendix B.41. Dates, times, and positions of the release (launch) and recoveries of drift cards numbered 13300-13399.

DRIFT CARDS	DATE	TIME	LATITUDE (DEG N)	LONGITUDE (DEG W)
LAUNCH	7 2 80	0809	48 1.4	122 37.9
13300	7 3 80		48 9.8	122 37.8
13301	7 16 80		48 25.2	122 53.2
13302	7 3 80		48 9.8	122 37.8
13303	7 20 80		48 10.5	123 8.8
13304	7 9 80		48 9.7	122 39.3
13305	7 3 80		48 9.8	122 37.8
13308	7 4 80		48 9.5	122 40.8
13310	7 3 80		48 9.8	122 37.8
13312	7 3 80		48 9.8	122 37.8
13313	8 2 80		48 44.7	122 53.3
13315	7 3 80		48 9.8	122 37.8
13319	8 12 80		48 25.8	123 27.0
13322	7 9 80		48 27.5	122 55.3
13323	7 3 80		48 9.8	122 37.8
13328	9 6 80		48 9.6	122 37.2
13330	7 3 80		48 12.8	122 45.3
13331	7 3 80		48 9.8	122 37.8
13333	7 3 80		48 9.8	122 37.8
13334	7 3 80		48 9.8	122 37.8
13335	7 3 80		48 9.8	122 37.8
13337	7 3 80		48 9.8	122 37.8
13338	7 7 80		48 9.6	122 37.2
13339	7 3 80		48 9.8	122 37.8
13345	7 13 80		48 29.1	123 5.0
13346	7 3 80		48 9.8	122 37.8
13347	8 19 80		48 27.0	122 57.7
13353	8 2 80		48 8.3	123 35.3
13354	7 3 80		48 9.8	122 37.8
13355	7 3 80		48 9.8	122 37.8
13358	8 16 80		48 8.3	123 35.3
13359	8 4 80		48 19.4	123 38.0
13360	7 12 80	1000	48 24.3	123 20.9
13365	8 15 80		46 52.0	124 7.0
13369	8 7 80		48 25.4	123 23.0
13373	7 3 80		48 11.8	122 43.0
13374	7 15 80		48 24.4	123 21.8
13375	7 3 80		48 9.8	122 37.8
13376	7 22 80		48 26.1	123 18.1
13378	7 26 80		48 10.9	123 6.8
13381	7 6 80		48 9.8	122 38.3
13383	7 3 80		48 9.8	122 37.8
13386	8 4 80		48 9.6	122 37.2
13388	7 3 80		48 12.8	122 45.8
13391	7 4 80		48 9.5	122 40.8
13393	8 11 80		48 30.2	123 .5
13394	8 11 80		48 27.0	122 53.5
13396	7 9 80		48 25.3	123 25.0
13399	7 7 80	1130	48 25.8	123 27.3

Appendix B.42. Dates, times, and positions of the release (launch) and recoveries of drift cards numbered 13400-13499.

DRIFT CARDS	DATE	TIME	LATITUDE (DEG N)	LONGITUDE (DEG W)
LAUNCH	7 2 80	0810	48 1.5	122 36.8
13400	7 3 80	2000	47 59.2	122 30.4
1340_	7 3 80		47 58.1	122 32.7
13402	7 3 80	2000	47 59.2	122 30.4
13403	7 16 80		48 43.1	122 31.1
13406	7 3 80		47 58.1	122 32.7
13407	7 3 80		47 58.1	122 32.7
13409	7 3 80		47 58.1	122 32.7
13410	7 3 80		47 58.1	122 32.7
13412	7 3 80	2000	47 59.2	122 30.4
13414	7 3 80		48 9.8	122 37.8
13415	7 24 80		48 10.9	123 6.8
13416	7 3 80	2000	47 59.2	122 30.4
13418	7 3 80	2000	47 59.2	122 30.4
13420	7 23 80		48 24.2	123 20.8
13422	7 3 80	2000	47 59.2	122 30.4
13423	7 3 80		47 58.1	122 32.7
13424	7 3 80		47 58.1	122 32.7
13426	7 3 80	2000	47 59.2	122 30.4
13427	7 3 80		48 9.8	122 37.8
13428	7 3 80		47 58.1	122 32.7
13430	7 3 80		47 58.1	122 32.7
13431	7 3 80	2000	47 59.2	122 30.4
13432	7 3 80		47 58.1	122 32.7
13433	7 3 80		47 58.1	122 32.7
13438	7 3 80		48 9.8	122 37.8
13439	7 3 80		47 58.1	122 32.7
13440	7 3 80		47 58.1	122 32.7
13441	7 13 80	1530	48 14.3	122 45.7
13444	7 3 80	2000	47 59.2	122 30.4
13445	7 3 80	2000	47 59.2	122 30.4
13446	7 3 80		47 58.1	122 32.7
13447	7 3 80		47 58.1	122 32.7
13452	7 3 80		47 58.1	122 32.7
13455	7 3 80	2000	47 59.2	122 30.4
13456	7 3 80		47 58.1	122 32.7
13459	7 3 80	2000	47 59.2	122 30.4
13461	7 3 80	2000	47 59.2	122 30.4
13462	7 3 80		47 59.2	122 30.4
13463	7 4 80	1430	48 11.5	122 42.4
13465	7 3 80		48 9.8	122 37.8
13466	7 3 80		48 9.8	122 37.8
13467	7 19 80		47 59.4	122 31.3
13468	7 3 80		48 9.8	122 37.8
13469	7 3 80	2000	47 59.2	122 30.4
13471	7 3 80	2000	47 59.2	122 30.4
13472	7 _ 80		48 31.6	122 51.7
13474	7 3 80		47 58.1	122 32.7
13475	7 3 80	2000	47 59.2	122 30.4
13476	7 3 80		47 58.1	122 32.7
13479	7 3 80	2000	47 59.2	122 30.4
13480	7 3 80	2000	47 59.2	122 30.4
13483	7 3 80		48 9.8	122 37.8
13486	7 3 80		47 58.1	122 32.7
13487	8 7 80		48 25.9	123 15.5
13488	7 3 80		47 58.1	122 32.7
13489	7 3 80	2000	47 59.2	122 30.4
13490	7 4 80		47 59.2	122 30.4
13492	7 3 80	2000	47 59.2	122 30.4
13493	7 3 80		47 58.1	122 32.7
13494	7 3 80		47 58.1	122 32.7
13495	7 7 80		48 9.6	122 37.2
13497	7 25 80		48 9.7	122 39.3
13499	7 26 80		48 9.7	122 39.3

Appendix B.43. Dates, times, and positions of the release (launch) and recoveries of drift cards numbered 13500-13599.

DRIFT CARDS	DATE	TIME	LATITUDE (DEG N)	LONGITUDE (DEG W)
LAUNCH	7 2 80	0821	48 9.6	122 33.9
13501	7 4 80		48 15.3	122 37.4
13502	7 4 80		48 15.3	122 37.4
13506	7 6 80	1400	48 14.9	122 39.2
13508	7 4 80		48 15.3	122 37.4
13511	7 5 80		48 6.5	122 33.9
13512	7 12 80		48 8.2	122 33.8
13513	7 5 80		48 15.3	122 37.4
13514	7 4 80		48 17.3	122 38.6
13516	7 12 80		48 8.2	122 33.8
13517	7 5 80		48 15.3	122 37.4
13518	8 1 80		48 7.2	122 33.3
13519	7 6 80	1400	48 14.9	122 39.2
13520	7 4 80		48 15.3	122 37.8
13523	7 4 80		48 17.3	122 38.6
13524	7 5 80		48 8.2	122 33.8
13525	7 14 80		48 7.2	122 25.2
13527	7 6 80		48 15.3	122 37.4
13532	7 5 80	1000	48 16.4	122 38.5
13533	7 27 80		48 4.8	122 33.3
13535	7 5 80		48 6.5	122 33.9
13536	7 5 80	1530	48 6.5	122 26.7
13537	7 5 80		48 15.3	122 37.4
13538	7 5 80		48 15.3	122 37.4
13540	7 4 80		48 15.3	122 37.4
13541	7 4 80		48 15.3	122 37.4
13542	7 4 80		48 15.3	122 37.4
13544	7 6 80		48 1.0	122 32.2
13545	7 5 80		48 15.3	122 37.4
13548	7 5 80	1000	48 16.4	122 38.5
13549	7 4 80		48 15.3	122 37.4
13552	8 7 80		48 16.1	122 37.8
13553	7 6 80	1400	48 14.9	122 39.2
13555	7 5 80		48 6.5	122 33.9
13558	7 8 80	1130	48 7.2	122 33.3
13559	7 4 80		48 15.3	122 37.4
13560	7 12 80		48 8.2	122 33.8
13561	7 4 80		48 15.3	122 37.4
13562	7 4 80		48 15.3	122 37.4
13564	7 5 80		48 15.3	122 37.4
13565	7 4 80		48 15.3	122 37.4
13569	7 4 80		48 17.3	122 38.6
13570	7 4 80		48 15.3	122 37.4
13571	7 9 80		48 15.3	122 39.1
13572	8 25 80		48 16.4	122 33.5
13573	7 13 80		48 8.4	122 33.9
13574	7 12 80		48 8.2	122 33.8
13577	7 8 80	1130	48 7.2	122 33.3
13584	8 6 80		48 7.7	124 42.5
13585	7 4 80		48 17.8	122 38.6
13586	7 4 80		48 15.3	122 37.4
13588	7 4 80		48 15.3	122 37.4
13590	7 4 80		48 15.3	122 37.4
13591	7 13 80		48 8.4	122 33.9
13593	7 4 80		48 15.3	122 37.4
13595	7 7 80		48 5.2	122 33.5
13597	7 5 80		48 15.3	122 37.4
1359_	8 25 80		48 17.0	122 33.5

Appendix B.44. Dates, times, and positions of the release (launch) and recoveries of drift cards numbered 13600-13699.

DRIFT CARDS	DATE	TIME	LATITUDE (DEG N)	LONGITUDE (DEG W)
LAUNCH	7 2 80	0821	48 9.7	122 33.1
13600	7 4 80		48 17.8	122 30.4
13603	7 30 80		48 21.2	122 34.6
13607	7 17 80		48 25.6	122 50.6
13610	7 31 80		48 23.9	122 35.6
13611	7 9 80		48 18.1	122 29.9
13612	7 27 80		48 22.7	122 29.5
13613	7 4 80	1500	48 25.3	122 36.6
13616	7 5 80		48 23.2	122 33.7
13617	7 5 80		48 23.7	122 34.2
13626	7 4 80	1230	48 17.8	122 30.4
13631	7 6 80	1615	48 21.5	122 32.5
13633	7 3 80		48 25.3	122 36.6
13635	7 6 80		48 21.5	122 32.5
13636	7 7 80		48 24.0	122 37.4
13637	7 17 80		48 17.0	122 33.5
13638	7 11 80		48 24.0	122 39.7
13644	7 6 80		48 17.3	122 38.6
13645	7 26 80		48 16.4	122 33.5
13647	7 6 80	1900	48 24.2	122 38.0
13649	8 19 80		48 18.9	122 30.5
13651	7 4 80		48 17.8	122 30.4
13654	7 4 80		48 24.6	122 38.9
13656	7 7 80		48 21.6	122 35.6
13658	7 5 80		48 25.3	122 33.5
13661	7 5 80	1200	48 15.4	122 30.0
13663	7 5 80		48 23.3	122 34.4
13664	7 29 80		48 35.8	123 1.4
13666	7 9 80		48 21.6	122 35.6
13669	7 28 80		48 22.7	122 29.5
13673	7 4 80		48 26.7	122 34.5
13676	7 5 80		48 25.0	122 36.7
13677	7 4 80		48 18.1	122 30.0
13678	7 14 80		48 24.8	122 36.9
13681	7 4 80	1230	48 17.8	122 30.4
13684	7 4 80	1230	48 17.8	122 30.4
13689	7 20 80		48 3.5	122 54.9
13690	7 4 80	1230	48 17.8	122 30.4
13692	7 18 80		48 .5	122 12.7
13695	7 5 80		48 25.0	122 36.7
13698	7 5 80		48 24.1	122 32.7

Appendix B.45. Dates, times, and positions of the release (launch) and recoveries of drift cards numbered 13700-13799.

DRIFT CARDS	DATE	TIME	LATITUDE (DEG N)	LONGITUDE (DEG W)
LAUNCH	7 2 80	0821	48 9.7	122 32.2
13701	7 31 80		48 1.0	122 31.7
13712	7 7 80		48 7.7	122 28.1
13713	7 2 80		48 9.5	122 40.8
13722	7 7 80		48 1.0	122 31.7
13723	7 2 80		48 9.5	122 40.8
13740	7 4 80		48 7.7	122 28.1
13746	7 6 80		48 7.7	122 28.1
13749	7 22 80		48 7.2	122 27.2
13751	7 4 80		48 7.7	122 28.1
13753	7 4 80	1500	48 18.0	122 35.7
13755	7 4 80		48 7.7	122 28.1
13756	7 10 80		48 3.5	122 22.7
13766	7 2 80		48 9.5	122 40.8
13770	7 4 80		48 6.5	122 33.9
13771	7 4 80		48 7.7	122 28.1
13787	7 21 80		48 12.2	122 32.2
13793	7 7 80		48 7.7	122 28.1
13794	8 4 80		48 .8	122 32.2

Appendix B.46. Dates, times, and positions of the release (launch) and recoveries of drift cards numbered 13800-13899.

DRIFT CARDS	DATE	TIME	LATITUDE (DEG N)	LONGITUDE (DEG W)
LAUNCH	7 2 80	0835	48 16.4	122 29.2
13800	7 4 80	1300	48 13.5	122 40.4
13803	7 3 80	1830	48 17.6	122 38.3
13804	7 28 80		48 17.3	122 38.6
13806	7 3 80	1830	48 17.6	122 38.3
13807	7 3 80		48 16.2	122 39.5
13808	7 6 80	0700	48 16.0	122 39.3
13809	7 6 80	1400	48 15.3	122 39.1
13811	7 3 80	1830	48 17.6	122 38.3
13812	7 3 80		48 16.2	122 39.5
13813	7 6 80	0700	48 16.0	122 39.3
13814	7 6 80	0700	48 16.0	122 39.3
13815	7 3 80	1830	48 17.6	122 38.3
13816	7 3 80	1830	48 17.6	122 38.3
13818	7 6 80	0700	48 15.3	122 39.1
13819	7 3 80	1830	48 17.6	122 38.3
13821	7 3 80	0800	48 14.4	122 42.8
13824	7 6 80	0700	48 16.0	122 39.3
13825	7 22 80		48 17.4	122 38.3
13826	7 6 80	0700	48 16.0	122 39.3
13828	7 3 80	1830	48 17.6	122 38.3
13831	7 4 80		48 17.3	122 38.4
13832	7 3 80	1830	48 17.6	122 38.3
13833	7 6 80	0700	48 16.0	122 39.3
13834	7 2 80		48 13.3	122 39.7
13835	7 3 80	1830	48 17.6	122 38.3
13836	7 3 80	1830	48 17.6	122 38.3
13838	7 3 80	1830	48 17.6	122 38.3
13839	7 3 80	1830	48 17.6	122 38.3
13840	7 6 80	0700	48 16.0	122 39.3
13841	7 6 80	1830	48 16.0	122 39.3
13842	7 3 80	1830	48 17.6	122 38.3
13844	7 3 80	1830	48 17.6	122 38.3
13847	7 3 80	1830	48 17.6	122 38.3
13848	7 7 80	1815	48 13.3	122 38.4
13849	7 4 80		48 17.3	122 38.6
13850	7 3 80	1830	48 17.6	122 38.3
13851	7 30 80	1900	48 16.9	122 39.5
13854	7 6 80	0700	48 16.0	122 39.3
13855	7 3 80	1830	48 17.6	122 38.3
13858	7 3 80	1830	48 17.6	122 38.3
13859	7 6 80	0700	48 16.0	122 39.3
13860	7 4 80		48 17.3	122 38.4
13861	7 6 80	0700	48 16.0	122 39.3
13862	7 3 80	1830	48 17.6	122 38.3
13863	7 6 80	0700	48 16.0	122 39.3
13864	7 3 80	1830	48 17.6	122 38.3
13865	7 3 80	0800	48 14.4	122 42.8
13866	7 3 80	1830	48 17.6	122 38.3
13870	7 5 80		48 14.8	122 31.9
13872	7 6 80	0700	48 16.0	122 39.3
13873	7 3 80	1830	48 17.6	122 38.3
13874	7 3 80	1830	48 17.6	122 38.3
13875	7 3 80	1830	48 17.6	122 38.3
13879	7 3 80	0800	48 14.4	122 42.8
13880	7 6 80	0700	48 16.0	122 39.3
13882	7 17 80	1200	48 17.3	122 38.6
13883	7 3 80	1830	48 17.6	122 38.3
13884	7 3 80	1830	48 17.6	122 38.3
13885	7 4 80		48 17.3	122 38.6
13891	7 6 80	0700	48 16.0	122 39.3
13892	7 3 80	1830	48 17.6	122 38.3
13893	7 6 80	0700	48 16.0	122 39.3
13894	7 3 80	1830	48 17.6	122 38.3
13895	7 3 80		48 16.2	122 39.5
13896	7 3 80	1830	48 17.6	122 38.3
13898	7 4 80		48 17.3	122 38.6
13899	7 6 80	0700	48 16.0	122 39.3

Appendix B.47. Dates, times, and positions of the release (launch) and recoveries of drift cards numbered 13900-13999.

DRIFT CARDS	DATE	TIME	LATITUDE (DEG N)	LONGITUDE (DEG W)
LAUNCH	7 2 80	0836	48 16.5	122 30.4
13900	7 3 80	1800	48 18.0	122 35.7
13901	7 3 80		48 18.0	122 35.4
13902	7 3 80	1800	48 18.0	122 35.7
13903	7 3 80	1800	48 18.0	122 35.4
13905	7 3 80		48 18.0	122 35.7
13906	7 3 80	1800	48 18.0	122 35.7
13907	7 3 80	1800	48 18.0	122 35.7
13908	7 3 80	1800	48 18.0	122 35.7
13910	7 3 80	1800	48 18.0	122 35.7
13911	7 3 80	1800	48 18.0	122 35.7
13913	8 13 80		48 15.1	122 31.4
13914	7 3 80	1800	48 18.0	122 35.7
13915	7 3 80	1800	48 18.0	122 35.7
13916	7 3 80		48 18.0	122 35.4
13918	7 2 80	1820	48 17.2	122 37.3
13919	7 3 80	1800	48 18.0	122 35.7
13920	7 3 80	1800	48 18.0	122 35.7
13921	7 3 80	1800	48 18.0	122 35.7
13922	7 3 80		48 18.0	122 35.4
13923	7 3 80	1800	48 18.0	122 35.7
13925	7 22 80		48 17.9	122 36.0
13926	7 3 80		48 18.0	122 35.4
13928	7 3 80	1800	48 18.0	122 35.7
13929	7 6 80	1200	48 12.8	122 32.1
13930	7 3 80	1800	48 18.0	122 35.7
13932	7 3 80	1800	48 18.0	122 35.7
13933	7 3 80	1800	48 18.0	122 35.7
13934	7 3 80	1800	48 18.0	122 35.7
13936	7 13 80	1400	48 5.6	122 33.8
13937	7 3 80	1800	48 18.0	122 35.7
13938	7 3 80	1800	48 18.0	122 35.7
13939	7 3 80	1800	48 18.0	122 35.7
13940	7 3 80	1800	48 18.0	122 35.7
13941	7 3 80	1800	48 18.0	122 35.7
13942	7 3 80	1800	48 18.0	122 35.4
13943	8 3 80		48 34.6	122 59.6
13944	7 3 80	1800	48 18.0	122 35.7
13945	7 2 80	1830	48 17.3	122 38.6
13946	7 3 80	1800	48 18.0	122 35.7
13947	7 3 80	1800	48 18.0	122 35.7
13948	7 3 80	1800	48 18.0	122 35.7
13949	7 7 80		48 6.5	122 33.9
13950	7 17 80	1830	47 58.7	122 21.0
13951	7 3 80		48 18.0	122 35.4
13953	7 3 80		48 18.0	122 35.4
13957	7 3 80	1800	48 18.0	122 35.7
13958	7 3 80	1800	48 18.0	122 35.7
13959	7 3 80	1800	48 18.0	122 35.7
13960	7 3 80		48 18.0	122 35.4
13961	7 14 80		48 24.9	122 33.1
13962	7 3 80		48 18.0	122 35.4
13963	7 3 80	1800	48 18.0	122 35.7
13964	7 3 80	1800	48 18.0	122 35.7
13965	7 3 80		48 18.0	122 35.4
13967	7 3 80	1800	48 18.0	122 35.7
13968	7 3 80	1800	48 18.0	122 35.7
13969	7 3 80	1800	48 18.0	122 35.7
13970	7 3 80	1800	48 18.0	122 35.7
13971	7 3 80	1800	48 18.0	122 35.7
13972	7 3 80		48 18.0	122 35.4
13973	7 3 80	1800	48 18.0	122 35.7
13974	7 3 80	1800	48 18.0	122 35.7
13976	7 3 80		48 18.0	122 35.4
13977	7 3 80	1800	48 18.0	122 35.7
13979	7 3 80	1800	48 18.0	122 35.7
13980	8 10 80		48 27.7	123 1.8
13981	7 3 80	1800	48 18.0	122 35.7
13982	7 3 80		48 18.0	122 35.4
13983	7 13 80		48 12.2	122 32.2
13985	7 3 80	1800	48 18.0	122 35.7
13986	7 3 80	1800	48 18.0	122 35.7
13987	7 3 80	1800	48 18.0	122 35.7
13989	7 3 80	1800	48 18.0	122 35.7
13990	7 3 80	1800	48 18.0	122 35.7
13992	7 3 80	1800	48 18.0	122 35.7
13993	7 3 80	1800	48 18.0	122 35.4
13994	7 3 80		48 17.7	122 36.8
13995	8 5 80	1800	48 18.0	122 35.4
13999	7 3 80	1800		

Appendix B.40. Dates, times, and positions of the release (launch) and recoveries of drift cards numbered 14000-14099.

DRIFT CARDS	DATE	TIME	LATITUDE (DEG N)	LONGITUDE (DEG W)	DRIFT CARDS	DATE	TIME	LATITUDE (DEG N)	LONGITUDE (DEG W)
LAUNCH	7 1 80	1410	48 16.7	122 31.8					
14000	7 2 80	1500	48 18.1	122 30.2	14052	7 2 80	1500	48 18.1	122 30.2
14001	7 2 80	1500	48 18.1	122 30.2	14053	7 2 80	1500	48 18.1	122 30.2
14002	7 2 80	1500	48 18.1	122 30.2	14054	7 2 80	1500	48 18.1	122 30.2
14004	7 2 80	1500	48 18.1	122 30.2	14055	7 2 80	1500	48 18.1	122 30.2
14006	7 2 80	1500	48 18.1	122 30.2	14056	7 2 80	1500	48 18.1	122 30.2
14010	7 2 80	1500	48 18.1	122 30.2	14058	7 2 80	1500	48 18.1	122 30.2
14011	7 4 80		48 19.3	122 31.3	14060	7 2 80	1500	48 18.1	122 30.2
14012	7 2 80	1500	48 18.1	122 30.2	14063	7 2 80	1500	48 18.1	122 30.2
14013	7 2 80	1500	48 18.1	122 30.2	14064	7 2 80	1500	48 18.1	122 30.2
14015	7 2 80	1500	48 18.1	122 30.2	14068	7 10 80		48 24.1	122 32.7
14016	7 2 80	1500	48 18.1	122 30.2	14069	7 2 80	1500	48 18.1	122 30.2
14017	7 2 80	1500	48 18.1	122 30.2	14070	7 2 80	1500	48 18.1	122 30.2
14018	7 2 80	1500	48 18.1	122 30.2	14071	7 2 80	1500	48 18.1	122 30.2
14019	7 2 80	1500	48 18.1	122 30.2	14072	7 2 80	1500	48 18.1	122 30.2
14020	7 2 80	1500	48 18.1	122 30.2	14073	7 2 80	1500	48 18.1	122 30.2
14021	7 2 80	1500	48 18.1	122 30.2	14074	7 2 80	1500	48 18.1	122 30.2
14022	7 2 80	1500	48 18.1	122 30.2	14075	7 2 80	1500	48 18.1	122 30.2
14023	7 2 80	1500	48 18.1	122 30.2	14077	7 2 80	1500	48 18.1	122 30.2
14024	7 2 80	1500	48 18.1	122 30.2	14078	7 2 80	1500	48 18.1	122 30.2
14026	7 2 80	1500	48 18.1	122 30.2	14079	7 2 80	1500	48 18.1	122 30.2
14027	7 2 80	1500	48 18.1	122 30.2	14080	7 2 80	1500	48 18.1	122 30.2
14029	7 2 80	1500	48 18.1	122 30.2	14081	7 2 80	1500	48 18.1	122 30.2
14030	7 2 80	1500	48 18.1	122 30.2	14082	7 2 80	1500	48 18.1	122 30.2
14032	7 2 80	1500	48 18.1	122 30.2	14083	7 2 80	1500	48 18.1	122 30.2
14034	7 4 80		48 17.8	122 30.4	14085	7 2 80	1500	48 18.1	122 30.2
14035	7 2 80	1500	48 18.1	122 30.2	14086	7 2 80	1500	48 18.1	122 30.2
14037	7 2 80	1500	48 18.1	122 30.2	14087	7 3 80		48 21.6	122 35.6
14039	6 28 80		48 26.2	122 34.5	14088	7 2 80	1500	48 18.1	122 30.2
14040	7 2 80	1500	48 18.1	122 30.2	14089	7 2 80	1500	48 18.1	122 30.2
14041	7 2 80	1500	48 18.1	122 30.2	14090	7 2 80	1500	48 18.1	122 30.2
14042	7 2 80	1500	48 18.1	122 30.2	14091	7 2 80	1500	48 18.1	122 30.2
14043	7 2 80	1500	48 18.1	122 30.2	14092	7 2 80	1500	48 18.1	122 30.2
14044	7 2 80	1500	48 18.1	122 30.2	14093	7 2 80	1500	48 18.1	122 30.2
14045	6 28 80		48 24.0	122 32.6	14094	7 2 80	1500	48 18.1	122 30.2
14046	7 2 80	1500	48 18.1	122 30.2	14095	7 2 80	1500	48 18.1	122 30.2
14047	7 2 80	1500	48 18.1	122 30.2	14096	7 2 80	1500	48 18.1	122 30.2
14048	7 2 80	1500	48 18.1	122 30.2	14097	7 2 80	1500	48 18.1	122 30.2
14049	7 2 80	1500	48 18.1	122 30.2	14098	7 2 80	1500	48 18.1	122 30.2
14051	7 24 80		48 23.3	122 36.6	14099	7 2 80	1500	48 18.1	122 30.2

Appendix B.49. Dates, times, and positions of the release (launch) and recoveries of drift cards numbered 14100-14199.

DRIFT CARDS	DATE	TIME	LATITUDE (DEG N)	LONGITUDE (DEG W)
LAUNCH	7 1 80	1426	48 20.4	122 32.1
14104	7 5 80		48 25.3	122 33.5
14105	7 8 80		48 25.3	122 33.5
14106	7 10 80		48 15.2	122 29.2
14107	7 3 80		48 24.8	122 33.0
14110	7 3 80		48 24.1	122 34.1
14111	7 2 80	1500	48 18.1	122 30.2
14113	7 2 80		48 21.6	122 35.6
14114	7 7 80		48 21.6	122 35.6
14115	7 9 80		48 23.6	122 35.0
14116	7 2 80		48 21.6	122 35.6
14117	8 1 80		48 24.1	122 34.1
14122	7 26 80		48 25.3	122 33.5
14124	8 30 80		48 23.3	122 34.1
14128	7 3 80	0800	48 14.4	122 42.8
14129	8 13 80		48 16.3	124 18.6
14131	7 2 80	1700	48 21.2	122 34.6
14132	7 2 80	1500	48 18.1	122 30.2
14133	8 12 80		48 26.2	122 34.7
14134	7 3 80		48 25.3	122 36.6
14135	9 12 80	1500	48 17.4	122 34.0
14136	7 2 80	1500	48 18.1	122 30.2
14139	7 3 80	0930	48 24.0	122 37.4
14141	7 2 80		48 21.6	122 35.6
14142	7 8 80	1530	48 25.3	122 33.5
14143	8 13 80		48 23.7	122 35.4
14144	7 2 80	1500	48 18.1	122 30.2
14146	7 8 80	1900	48 17.2	122 37.3
14148	7 2 80	1700	48 21.2	122 34.6
14149	7 4 80		48 17.2	122 37.3
14151	7 4 80		48 17.3	122 38.6
14157	8 2 80		48 27.3	122 54.8
14159	7 2 80		48 23.5	122 35.1
14160	7 4 80		48 24.8	122 33.0
14166	7 3 80	1000	48 22.5	122 31.3
14167	7 2 80		48 16.3	122 27.7
14169	7 2 80		48 21.6	122 35.6
14178	7 2 80	1500	48 18.1	122 30.2
14183	7 2 80	1500	48 18.1	122 30.2
14184	7 2 80	1100	48 24.1	122 32.7
14185	7 5 80	0900	48 23.7	122 32.1
14186	7 9 80		48 21.6	122 35.6
14187	7 15 80		48 26.8	122 33.5
14188	7 2 80	1500	48 18.1	122 30.2
14190	8 9 80		48 26.2	122 34.1
14193	7 3 80		48 18.0	122 35.4
14195	7 2 80	1500	48 18.1	122 30.2
14196	7 20 80	1500	48 21.6	122 28.4
14197	7 17 80	1300	48 17.3	122 38.6

Appendix B.50. Dates, times, and positions of the release (launch) and recoveries of drift cards numbered 14200-14299.

DRIFT CARDS	DATE	TIME	LATITUDE (DEG N)	LONGITUDE (DEG W)
LAUNCH	7 2 80	0843	48 20.4	122 32.1
14200	7 2 80	1700	48 21.2	122 35.3
14201	7 2 80	1700	48 21.2	122 35.3
14202	7 2 80	1700	48 21.2	122 35.3
14203	7 2 80	1700	48 21.2	122 35.3
14204	7 2 80	1700	48 21.2	122 35.3
14205	7 2 80	1700	48 21.2	122 35.3
14206	7 2 80	1700	48 21.2	122 35.3
14207	7 2 80	1700	48 21.2	122 35.3
14208	7 2 80	1700	48 21.2	122 35.3
14209	7 2 80	1700	48 21.2	122 35.3
14210	7 2 80	1700	48 21.2	122 35.3
14211	7 2 80	1700	48 21.2	122 35.3
14212	7 2 80	1700	48 21.2	122 35.3
14213	7 2 80	1700	48 21.2	122 35.3
14214	7 2 80	1700	48 21.2	122 35.3
14215	7 2 80	1700	48 21.2	122 35.3
14216	7 2 80	1700	48 21.2	122 35.3
14217	7 2 80	1700	48 21.2	122 35.3
14218	7 2 80	1700	48 21.2	122 35.3
14219	7 2 80	1700	48 21.2	122 35.3
14220	7 2 80	1700	48 21.2	122 35.3
14221	7 2 80	1700	48 21.2	122 35.3
14222	7 2 80	1700	48 21.2	122 35.3
14223	7 2 80	1700	48 21.2	122 35.3
14224	7 2 80	1700	48 21.2	122 35.3
14225	7 2 80	1700	48 21.2	122 35.3
14226	7 2 80	1700	48 21.2	122 35.3
14227	7 2 80	1700	48 21.2	122 35.3
14228	7 2 80	1700	48 21.2	122 35.3
14229	7 2 80	1700	48 21.2	122 35.3
14230	7 2 80	1700	48 21.2	122 35.3
14231	7 2 80	1700	48 21.2	122 35.3
14232	7 2 80	1700	48 21.2	122 35.3
14233	7 2 80	1700	48 21.2	122 35.3
14234	7 2 80	1700	48 21.2	122 35.3
14235	7 2 80	1700	48 21.2	122 35.3
14236	7 2 80	1700	48 21.2	122 35.3
14237	7 2 80	1700	48 21.2	122 35.3
14238	7 2 80	1700	48 21.2	122 35.3
14239	7 2 80	1700	48 21.2	122 35.3
14240	7 2 80	1700	48 21.2	122 35.3
14241	7 2 80	1700	48 21.2	122 35.3
14242	7 2 80	1700	48 21.2	122 35.3
14243	7 2 80	1700	48 21.2	122 35.3
14244	7 2 80	1700	48 21.2	122 35.3
14245	7 2 80	1700	48 21.2	122 35.3
14246	7 2 80	1700	48 21.2	122 35.3
14247	7 2 80	1700	48 21.2	122 35.3
14248	7 2 80	1700	48 21.2	122 35.3
14249	7 2 80	1700	48 21.2	122 35.3
14250	7 2 80	1700	48 21.2	122 35.3
14251	7 2 80	1700	48 21.2	122 35.3
14252	7 2 80	1700	48 21.2	122 35.3
14253	7 2 80	1700	48 21.2	122 35.3
14254	7 2 80	1700	48 21.2	122 35.3
14255	7 2 80	1700	48 21.2	122 35.3
14256	7 2 80	1700	48 21.2	122 35.3
14257	7 2 80	1700	48 21.2	122 35.3
14258	7 2 80	1700	48 21.2	122 35.3
14259	7 2 80	1700	48 21.2	122 35.3
14260	7 2 80	1700	48 21.2	122 35.3
14261	7 2 80	1700	48 21.2	122 35.3
14262	7 2 80	1700	48 21.2	122 35.3
14263	7 2 80	1700	48 21.2	122 35.3
14264	7 2 80	1700	48 21.2	122 35.3
14265	7 2 80	1700	48 21.2	122 35.3
14266	7 2 80	1700	48 21.2	122 35.3
14267	7 2 80	1700	48 21.2	122 35.3
14268	7 2 80	1700	48 21.2	122 35.3
14269	7 2 80	1700	48 21.2	122 35.3
14270	7 2 80	1700	48 21.2	122 35.3
14271	7 2 80	1700	48 21.2	122 35.3

Appendix B.50. Dates, times, and positions of the release (launch) and recoveries of drift cards numbered 14200-14299 (continued).

DRIFT CARDS	DATE	TIME	LATITUDE (DEG N)	LONGITUDE (DEG W)
14272	7 2 80	1700	48 21.2	122 35.3
14273	7 2 80	1700	48 21.2	122 35.3
14274	7 2 80	1700	48 21.2	122 35.3
14275	7 2 80	1700	48 21.2	122 35.3
14276	7 2 80	1700	48 21.2	122 35.3
14277	7 2 80	1700	48 21.2	122 35.3
14278	7 2 80	1700	48 21.2	122 35.3
14279	7 2 80	1700	48 21.2	122 35.3
14280	7 5 80		48 17.2	122 37.3
14281	7 2 80	1700	48 21.2	122 35.3
14282	7 2 80	1700	48 21.2	122 35.3
14283	7 2 80	1700	48 21.2	122 35.3
14284	7 2 80	1700	48 21.2	122 35.3
14285	7 2 80	1700	48 21.2	122 35.3
14286	7 2 80	1700	48 21.2	122 35.3
14287	7 2 80	1700	48 21.2	122 35.3
14288	7 2 80	1700	48 21.2	122 35.3
14289	7 2 80	1700	48 21.2	122 35.3
14290	7 2 80	1700	48 21.2	122 35.3
14291	7 2 80	1700	48 21.2	122 35.3
14292	7 2 80	1700	48 21.2	122 35.3
14293	7 2 80	1700	48 21.2	122 35.3
14294	7 2 80	1700	48 21.2	122 35.3
14295	7 2 80	1700	48 21.2	122 35.3
14296	7 2 80	1700	48 21.2	122 35.3
14297	7 2 80	1700	48 21.2	122 35.3
14298	7 2 80	1700	48 21.2	122 35.3
14299	7 2 80	1700	48 21.2	122 35.3

Appendix B.51. Dates, times, and positions of the release (launch) and recoveries of drift cards numbered 14300-14399.

DRIFT CARDS	DATE	TIME	LATITUDE (DEG N)	LONGITUDE (DEG W)
LAUNCH	7 2 80	0848	48 18.2	122 28.9
14302	7 5 80		48 17.4	122 30.7
14305	7 19 80		48 18.0	122 30.3
14306	7 7 80		48 17.3	122 31.1
14308	7 5 80		48 17.4	122 30.7
14310	7 5 80		48 17.4	122 30.7
14313	7 6 80		48 11.7	122 35.8
14316	7 17 80		48 17.3	122 38.6
14317	7 19 80		48 18.0	122 30.3
14319	7 19 80		48 18.0	122 30.3
14321	7 7 80		48 15.3	122 39.1
14322	7 5 80		48 23.2	122 33.7
14323	7 6 80	1400	48 14.9	122 39.2
14327	7 5 80		48 17.4	122 30.7
14329	7 17 80		48 17.3	122 38.6
14331	7 5 80		48 17.4	122 30.7
14333	7 5 80		48 17.4	122 30.7
14334	7 4 80		48 17.3	122 38.6
14335	8 15 80		48 34.8	123 .5
14336	7 19 80		48 18.0	122 30.3
14337	7 7 80		48 17.0	122 32.2
14338	7 27 80		48 17.6	122 31.0
14341	7 19 80		48 18.0	122 30.3
14342	7 5 80		48 17.4	122 30.7
14344	7 6 80	1700	48 12.8	122 37.0
14345	7 19 80		48 18.0	122 30.3
14348	7 17 80		48 17.3	122 38.6
14350	7 17 80		48 17.3	122 38.6
14354	7 5 80		48 17.4	122 30.7
14356	7 8 80	0900	48 17.5	122 30.9
14357	7 4 80	1300	48 17.8	122 30.4
14358	7 5 80		48 17.4	122 30.7
14359	7 4 80		48 17.2	122 39.0
14363	7 19 80		48 18.0	122 30.3
14365	7 6 80	1400	48 16.3	122 27.7
14367	7 6 80		48 5.8	122 31.4
14368	7 17 80		48 17.3	122 38.6
14369	7 2 80		48 17.2	122 37.3
14370	7 17 80		48 17.3	122 38.6
14371	7 5 80		48 17.4	122 30.7
14372	7 10 80		48 5.8	122 31.4
14374	7 19 80		48 18.0	122 30.3
14375	7 19 80		48 18.0	122 30.3
14376	7 28 80		48 19.3	122 50.5
14377	7 5 80		48 23.6	122 34.1
14379	7 19 80		48 18.0	122 30.3
14381	7 10 80	1100	48 17.2	122 38.0
14383	7 19 80		48 18.0	122 30.3
14384	7 5 80		48 16.4	122 38.5
14385	7 19 80		48 18.0	122 30.3
14392	7 3 80		48 17.3	122 31.1
14399	7 18 80		48 15.3	122 39.1

Appendix B.52. Dates, times, and positions of the release (launch) and recoveries of drift cards numbered 14400-14499.

DRIFT CARDS	DATE	TIME	LATITUDE (DEG N)	LONGITUDE (DEG W)
LAUNCH	7 2 80	0836	48 10.6	122 31.5
14400	7 5 80		48 13.1	122 32.2
14401	7 4 80		48 17.3	122 38.6
14403	7 3 80	0800	48 14.4	122 42.8
14404	7 3 80	0800	48 14.4	122 42.8
14405	7 3 80		48 16.2	122 39.5
14407	7 6 80		48 15.1	122 29.3
14411	7 3 80		48 16.2	122 39.5
14412	7 3 80	0800	48 14.4	122 42.8
14413	7 3 80	0800	48 14.4	122 42.8
14416	7 10 80		48 13.3	122 41.4
14418	7 3 80	0800	48 14.4	122 42.8
14419	7 3 80	0800	48 14.4	122 42.8
14420	7 3 80	0800	48 14.4	122 42.8
14421	7 3 80	0800	48 14.4	122 42.8
14422	7 5 80		48 11.5	122 35.6
14423	7 3 80		48 16.2	122 39.5
14424	7 3 80	0600	48 14.4	122 42.8
14425	7 6 80	1500	48 15.3	122 39.1
14426	7 11 80		48 12.2	122 32.2
14427	7 3 80	0800	48 14.4	122 42.8
14428	7 3 80	0800	48 14.4	122 42.8
14430	7 3 80	0800	48 14.4	122 42.8
14431	7 8 80	1400	48 15.3	122 39.1
14432	7 3 80	0800	48 14.4	122 42.8
14433	7 3 80	0800	48 14.4	122 42.8
14434	7 3 80	0800	48 14.4	122 42.8
14435	7 6 80	1500	48 15.3	122 39.1
14436	7 3 80	0800	48 14.4	122 42.8
14437	7 3 80	0800	48 14.4	122 42.8
14439	7 3 80		48 16.2	122 39.5
14441	7 3 80		48 16.2	122 39.5
14442	7 3 80	0800	48 14.4	122 42.8
14443	7 3 80	0800	48 14.4	122 42.8
14446	7 3 80	0800	48 14.4	122 42.8
14448	7 5 80		48 14.9	122 39.2
14450	7 9 80	2100	48 17.2	122 39.0
14451	7 3 80	0800	48 14.4	122 42.8
14452	7 3 80	0800	48 14.4	122 42.8
14453	7 3 80	0800	48 14.4	122 42.8
14454	7 3 80	0800	48 14.4	122 42.8
14455	7 4 80	1000	48 13.6	122 43.8
14457	7 5 80	0915	48 14.8	122 31.9
14459	7 3 80	0800	48 14.4	122 42.8
14460	7 4 80		48 17.3	122 38.6
14462	7 6 80	1500	48 15.3	122 39.1
14465	7 3 80	0800	48 14.4	122 42.8
14466	7 3 80	0800	48 14.4	122 42.8
14469	7 3 80	0800	48 14.4	122 42.8
14470	7 3 80	0800	48 14.4	122 42.8
14471	7 3 80	0800	48 14.4	122 42.8
14472	7 3 80	0800	48 14.4	122 42.8
14473	7 4 80	2100	48 14.5	122 40.9
14475	7 12 80	1500	48 8.2	122 33.8
14476	9 3 80		48 13.2	122 41.6
14478	7 3 80	0800	48 14.4	122 42.8
14479	7 3 80	0800	48 14.4	122 42.8
14482	7 3 80		48 17.3	122 38.6
14483	7 28 80		48 13.0	122 43.4
14486	7 3 80	0800	48 14.4	122 42.8
14488	7 3 80		48 16.2	122 39.5
14489	7 14 80		48 13.5	122 38.9
14490	7 3 80	0800	48 14.4	122 42.8
14491	8 9 80		48 13.6	122 43.9
14492	7 3 80	0800	48 14.4	122 42.8
14493	7 3 80	0800	48 14.4	122 42.8
14494	7 3 80	0800	48 14.4	122 42.8
14495	7 21 80		48 31.6	122 55.0
14496	7 3 80	0800	48 14.4	122 42.8
14497	7 3 80	0800	48 14.4	122 42.8
14498	7 3 80	0800	48 14.4	122 42.8
14499	7 3 80	0800	48 14.4	122 42.8

Appendix B.53. Dates, times, and positions of the release (launch) and recoveries of drift cards numbered 14500-14599.

DRIFT CARDS	DATE	TIME	LATITUDE (DEG N)	LONGITUDE (DEG W)
LAUNCH	7 2 80	0900	48 15.1	122 35.2
14500	7 3 80	0800	48 14.4	122 42.8
14501	7 3 80		48 18.0	122 35.4
14502	7 3 80	0800	48 14.4	122 42.8
14504	7 3 80		48 18.0	122 35.4
14505	7 3 80		48 18.0	122 35.4
14506	7 3 80	0800	48 14.4	122 42.8
14507	7 3 80		48 18.0	122 35.4
14508	7 6 80		48 17.3	122 38.6
14509	7 5 80		48 14.9	122 39.2
14510	7 3 80		48 17.2	122 39.0
14511	7 3 80	0830	48 14.4	122 42.8
14512	7 3 80	0800	48 14.4	122 42.8
14513	7 3 80		48 18.0	122 35.4
14514	7 3 80		48 18.0	122 35.4
14515	7 3 80		48 18.0	122 35.4
14516	7 6 80	0700	48 16.2	122 39.5
14517	7 3 80		48 18.0	122 35.4
14518	7 3 80		48 18.0	122 35.4
14519	7 3 80		48 18.0	122 35.4
14520	7 3 80		48 18.0	122 35.4
14521	7 3 80		48 18.0	122 35.4
14523	7 3 80		48 18.0	122 35.4
14524	7 3 80		48 18.0	122 35.4
14525	7 3 80		48 18.0	122 35.4
14527	7 3 80		48 18.0	122 35.4
14528	7 3 80		48 18.0	122 35.4
14529	7 3 80		48 18.0	122 35.4
14530	7 3 80		48 17.2	122 39.0
14531	7 3 80		48 18.0	122 35.4
14532	7 3 80		48 18.0	122 35.4
14533	7 3 80	0600	48 14.4	122 42.8
14534	7 3 80		48 18.0	122 35.4
14535	7 3 80		48 18.0	122 35.4
14536	7 3 80		48 18.0	122 35.4
14537	7 3 80		48 18.0	122 35.4
14538	7 3 80		48 18.0	122 35.4
14539	7 8 80	2000	48 17.5	122 37.3
14541	7 3 80		48 18.0	122 35.4
14542	7 12 80		48 13.3	122 41.0
14543	7 3 80		48 18.0	122 35.4
14544	7 3 80		48 18.0	122 35.4
14545	7 3 80		48 18.0	122 35.4
14546	7 3 80		48 18.0	122 35.4
14548	7 3 80		48 18.0	122 35.4
14549	7 3 80		48 18.0	122 35.4
14550	7 5 80	1100	48 13.3	122 41.0
14551	7 2 80		48 13.3	122 39.7
14552	7 3 80		48 18.0	122 35.4
14553	7 3 80		48 18.0	122 35.4
14555	7 3 80	0800	48 14.4	122 42.8
14556	7 4 80		48 17.3	122 38.6
14557	7 3 80	0800	48 14.4	122 42.8
14559	7 3 80		48 18.0	122 35.4
14560	7 3 80	0830	48 14.4	122 42.8
14561	7 3 80		48 18.0	122 35.4
14563	7 3 80		48 18.0	122 35.4
14564	7 3 80		48 18.0	122 35.4
14565	7 3 80		48 18.0	122 35.4
14566	7 3 80		48 18.0	122 35.4
14567	7 3 80		48 18.0	122 35.4
14568	7 3 80	0800	48 14.4	122 42.8
14569	7 3 80	0800	48 14.4	122 42.8
14570	7 3 80	0800	48 14.4	122 42.8
14571	7 4 80		48 13.5	122 38.9
14572	7 3 80	0800	48 14.4	122 42.8
14574	7 3 80		48 18.0	122 35.4
14575	7 3 80		48 18.0	122 35.4
14576	7 3 80		48 18.0	122 35.4
14577	7 3 80	0830	48 14.4	122 42.8
14578	7 3 80		48 18.0	122 35.4
14580	7 3 80		48 18.0	122 35.4
14582	7 3 80	0830	48 14.4	122 42.8
14583	7 3 80		48 18.0	122 35.4
14584	7 3 80		48 18.0	122 35.4

Appendix B.53. Dates, times, and positions of the release (launch) and recoveries of drift cards numbered 14500-14599 (continued).

DRIFT CARDS	DATE	TIME	LATITUDE (DEG N)	LONGITUDE (DEG W)
14586	7 3 80		48 18.0	122 35.4
14587	7 3 80		48 18.0	122 35.4
14588	7 3 80		48 18.0	122 35.4
14589	7 3 80	1130	48 17.3	122 38.6
14590	7 27 80		48 14.7	122 39.5
14591	7 3 80	0800	48 14.4	122 42.8
14592	7 3 80		48 18.0	122 35.4
14593	7 3 80		48 18.0	122 35.4
14594	7 3 80		48 18.0	122 35.4
14595	7 3 80		48 18.0	122 35.4
14596	7 3 80		48 18.0	122 35.4
14597	7 3 80		48 18.0	122 35.4
14598	7 3 80		48 18.0	122 35.4
14599	7 3 80		48 18.0	122 35.4

APPENDIX C

Selected Net Currents Near the Surface (0-6 m Depth) in Puget Sound, the Strait of Juan de Fuca, San Juan Islands, and the Strait of Georgia. Stations are Listed by Areas and Data Sources.

Appendix C. Selected net currents near the surface (0-6 m) in Puget Sound, the Strait of Juan de Fuca, San Juan Islands, and the Strait of Georgia.

Station No.	Latitude (°N)	Longitude (°W)	Depth (m)	Net Velocity (cm/s)	Net Direction (°T)	Observation Period Begin Date	Observation Period Duration (Days)
I. STRAIT OF GEORGIA							
A. National Ocean Survey (unpublished, a)							
48	48° 51.47'	122° 46.10'	5.0	0.46	42	4-01-75	
48	48° 51.47'	122° 45.95'	5.0	2.55	317	2-05-75	
48	48° 51.47'	122° 46.10'	5.0	5.51	305	3-05-75	
49	48° 49.42'	122° 49.08'	5.0	9.47	128		
50	48° 47.10'	122° 51.60'	5.0	9.46	129		
51	48° 45.30'	122° 51.80'	5.0	20.57	175		
53	48° 46.65'	122° 55.30'	5.0	28.47	313		
55	48° 50.47'	122° 58.05'	5.0	14.59	7		
56	48° 53.30'	122° 53.50'	5.0	9.13	308		
59	48° 54.60'	122° 09.47'	5.0	15.97	161		
60	48° 52.85'	122° 12.75'	5.0	10.19	143		
II. HARO STRAIT							
A. National Ocean Survey (unpublished, a)							
C-62	48° 27.85'	123° 07.13'	4.5	33.40	152	9-20-75	33.0
C-62	48° 27.83'	123° 07.03'	4.5	15.99	124	9-02-76	16.3
C-63	48° 27.20'	123° 09.22'	3.9	16.84	176	9-16-76	20.50
C-63	48° 27.20'	123° 09.22'	4.5	5.04	123	9-02-76	16.33
C-63	48° 27.00'	123° 09.60'	4.5	7.86	138	9-17-75	20.50
C-63	48° 27.10'	123° 09.40'	4.5	11.55	137	10-05-75	12.17
C-64	48° 26.33'	123° 12.35'	3.9	68.12	156	9-02-76	16.33
C-64	48° 26.35'	123° 12.30'	4.5	62.61	157	10-05-75	16.33
C-103	48° 35.53'	123° 15.13'	6.1	23.98	164	9-21-76	16.33
C-105	48° 29.85'	123° 16.47'	4.5	15.64	146	9-03-76	20.50
C-107	48° 38.88'	123° 15.05'	4.5	39.60	145	9-21-76	8.00
C-109	48° 42.03'	123° 19.03'	4.8	9.01	101	9-21-76	8.00
C-110	48° 42.60'	123° 17.10'	3.9	27.98	189	9-22-76	16.33
C-111	48° 43.62'	123° 11.48'	4.5	20.29	236	10-05-76	16.33
C-112	48° 42.35'	123° 09.72'	4.5	15.60	221	10-05-76	16.33
C-113	48° 40.95'	123° 08.55'	4.5	5.64	141	10-05-76	16.33
C-117	48° 41.50'	123° 05.57'	4.5	13.50	41	10-07-76	16.33
C-121	48° 44.35'	123° 17.07'	5.1	6.08	77	10-05-76	16.33
C-122	48° 36.77'	123° 19.92'	4.5	25.85	132	9-03-76	20.50

Appendix C (continued).

Station No.	Latitude (°N)	Longitude (°W)	Depth (m)	Net Velocity (cm/s)	Net Direction (°T)	Observation Period Begin Date	Observation Period Duration (Days)
III. SAN JUAN ISLANDS							
A. National Ocean Survey (unpublished, a)							
52	48° 44.25'	122° 53.80'	5.0	13.39	242		
61	48° 40.60'	123° 00.15'	5.0	34.62	202		
C-106	48° 38.95'	123° 08.60'	4.5	6.82	290	9-22-76	16.33
IV. ROSARIO STRAIT - BELLINGHAM BAY							
A. National Ocean Survey (unpublished, a)							
17	48° 38.6'	122° 38.8'	4.6	5.8	167	3-21-74	16.0
18	48° 37.65'	122° 36.00'	5.0	10.68	38	3-06-75	
20	48° 40.65'	122° 42.42'	5.0	10.72	56	3-12-75	
24	48° 40.50'	122° 36.05'	5.0	0.70	130	3-05-75	
45	48° 40.98'	122° 46.50'	5.0	16.25	145	3-06-75	
C-9a	48° 27.13'	122° 46.93'	4.5	19.55	183	10-04-75	16.33
C-9c	48° 27.40'	122° 40.40'	4.5	5.26	305	9-22-75	28.83
B. University of Washington (unpublished)							
A	48° 43.9'	122° 36.0'	3.1	2.7	153	4-17-63	23
A	48° 43.9'	122° 36.0'	3.1	4.2	127	5-09-63	19
B	48° 45.2'	122° 34.0'	3.1	4.5	165	4-17-63	23
B	48° 45.2'	122° 34.0'	3.1	5.1	141	5-09-63	19
C	48° 44.8'	122° 31.5'	3.1	15.1	211	4-17-63	23
C	48° 44.8'	122° 31.5'	3.1	10.3	210	5-09-63	19
G	48° 42.1'	122° 35.5'	3.1	6.6	249	4-17-63	23
I	48° 42.1'	122° 31.7'	3.1	3.6	95	5-09-63	19
J	48° 40.0'	122° 34.6'	3.1	2.4	201	5-09-63	19
K	48° 40.0'	122° 33.0'	3.1	3.5	18	5-09-63	19

Appendix C (continued).

Station No.	Latitude (°N)	Longitude (°W)	Depth (m)	Net Velocity (cm/s)	Net Direction (°T)	Observation Period Begin Date	Observation Period Duration (Days)
IV. ROSARIO STRAIT - BELLINGHAM BAY							
C. Schumacher and Reynolds (1975)							
1	48° 26.12'	122° 47.00'	5.0	17.16	175	1-29-74	15.2
2	48° 25.90'	122° 44.80'	5.0	15.37	209	1-29-74	7.5
3	48° 26.05'	122° 43.00'	5.0	7.42	127	1-30-74	15.1
5	48° 28.90'	122° 46.50'	5.0	13.72	239	1-30-74	15.1
8	48° 31.35'	122° 44.90'	5.0	6.57	197	2-15-74	16.9
9a	48° 27.08'	122° 46.95'	5.0	24.10	190	3-12-74	23.1
9b	48° 40.87'	122° 47.90'	5.0	14.89	200	1-29-74	28.0
11	48° 33.65'	122° 44.85'	5.0	2.02	88	2-15-74	16.9
15	48° 37.29'	122° 45.00'	5.0	7.23	245	3-06-74	14.9
19	48° 39.85'	122° 42.93'	5.0	19.05	87	3-02-74	14.8
20a	48° 40.40'	122° 42.30'	5.0	13.99	35	2-14-74	34.7
20b	48° 40.40'	122° 42.30'	5.0	11.33	35	3-06-74	34.7
23	48° 31.43'	122° 37.89'	5.0	22.34	234	3-03-74	14.9
D. National Ocean Survey (unpublished, b)							
1570	48° 31.5'	122° 39.1'	2.5	24.97	276	3-22-64	4.5
1575a	48° 30.7'	122° 35.1'	2.4	13.20	298	5-21-63	4.1
1575b	48° 30.6'	122° 34.4'	2.1	9.64	262	5-21-63	4.2
1575b	48° 30.6'	122° 34.4'	6.1	1.31	114	5-21-63	4.2
1575c	48° 30.7'	122° 33.9'	3.4	5.98	261	5-21-63	4.2
1580	48° 31.9'	122° 33.7'	4.6	2.00	200	9-28-64	4.0
1590	48° 35.0'	122° 34.7'	4.6	4.44	242	4-24-64	4.0
1595	48° 38.9'	122° 34.1'	4.6	4.85	138	9-28-64	4.2
1605	48° 36.8'	122° 42.2'	4.6	11.47	311	3-22-64	4.2
1610	48° 36.1'	122° 38.9'	4.6	18.69	194	4-24-64	5.0
1615	48° 38.5'	122° 39.2'	4.6	21.30	111	6-21-56	4.0
1620	48° 38.6'	122° 39.4'	4.6	1.93	9	9-28-64	4.0

Appendix C (continued).

Station No.	Latitude (°N)	Longitude (°W)	Depth (m)	Net Velocity (cm/s)	Net Direction (°T)	Observation Period Begin Date	Observation Period Duration (Days)
V. OUTER STRAIT OF JUAN DE FUCA							
A. National Ocean Survey (unpublished, a)							
93	48° 21.45'	123° 50.10'	4.5	9.14	31	2-19-76	16.33
C-96	48° 15.08'	124° 06.30'	4.5	27.65	125	10-06-75	33.00
C-97	48° 17.95'	124° 04.90'	4.5	11.75	175	9-30-75	33.00
C-98	48° 21.90'	124° 02.25'	4.5	7.47	252	9-30-75	16.33
VI. INNER STRAIT OF JUAN DE FUCA							
A. Holbrook et al. (1979)							
ST-9	48° 23.3'	123° 01.5'	4.0	15.3	324	12-19-77	109
ST-8	48° 14.6'	123° 15.4'	4.0	20.1	243	1-02-78	44
ST-10	48° 13.0'	122° 57.2'	4.0	22.1	319	12-19-77	119
ST-13	48° 14.1'	122° 57.4'	4.0	26.7	296	7-16-78	94
B. National Ocean Survey (unpublished, a)							
66	48° 23.90'	122° 56.50'	4.5	5.39	327	2-19-76	20.50
71	48° 17.90'	122° 52.03'	4.5	14.30	334	3-03-76	28.83
71	48° 17.70'	122° 52.17'	5.5	15.42	314	2-18-76	16.33
74	48° 24.07'	122° 41.03'	4.5	16.49	213	3-02-76	16.33
77	48° 14.80'	122° 48.60'	4.5	30.62	210	3-04-76	20.50
32	48° 25.85'	122° 56.45'	4.5	10.41	306	2-19-76	20.50
94	48° 08.13'	123° 25.00'	4.5	5.84	297	2-19-76	20.50
C-8	48° 08.15'	123° 17.45'	4.5	13.38	93	10-14-75	16.33
C-68	48° 23.13'	123° 09.67'	4.5	31.38	159	10-19-75	20.50
C-69	48° 19.73'	122° 58.85'	4.5	2.58	292	9-01-75	8.00
C-69	48° 19.75'	122° 58.87'	4.5	8.29	307	11-03-75	8.00
C-70	48° 16.62'	122° 58.40'	4.5	22.54	26	10-19-75	20.50

Appendix C (continued).

Station No.	Latitude (°N)	Longitude (°W)	Depth (m)	Net Velocity (cm/s)	Net Direction (°T)	Observation Period Begin Date	Observation Period Duration (Days)
VI. INNER STRAIT OF JUAN DE FUCA							
B. National Ocean Survey (unpublished, a)							
C-71	48° 17.00'	122° 52.10'	4.8	5.70	272	4-05-76	16.33
C-72	48° 24.30'	122° 46.50'	4.5	18.40	180	9-17-75	20.50
C-77	48° 14.25'	122° 48.40'	4.5	13.88	197	3-26-76	20.50
C-80	48° 06.45'	122° 57.45'	4.6	15.39	205	3-30-76	16.33
C-81	48° 10.93'	122° 56.07'	4.5	12.17	164	10-29-75	12.17
C-82	48° 11.23'	123° 09.50'	4.5	34.65	78	10-18-75	16.33
C-83	48° 14.90'	123° 12.10'	4.5	12.18	180	10-18-75	16.33
C-84	48° 19.30'	123° 15.87'	4.5	36.59	245	10-18-75	16.33
C-85	48° 23.45'	123° 16.97'	4.5	45.99	93	10-18-75	16.33
C-87	48° 16.70'	123° 22.02'	4.5	14.40	271	9-01-75	16.33
C-88	48° 22.42'	123° 26.13'	4.5	17.89	278	10-20-75	16.33
C-89	48° 10.62'	123° 32.52'	2.7	22.63	4	9-02-75	16.33
C-89	48° 10.62'	123° 32.52'	4.5	20.08	325	9-02-75	16.33
C-91	48° 16.85'	123° 32.60'	4.5	16.46	191	9-02-75	16.33
C-92	48° 05.62'	122° 53.93'	4.0	5.30	53	3-30-76	16.33
C. National Ocean Survey (1976)							
9	48° 16.4'	123° 31.9'	4.6	22.74	267	7-15-64	4.5
13	48° 19.2'	123° 22.1'	4.6	2.07	305	7-19-64	4.5
14	48° 15.6'	123° 19.9'	4.6	8.10	238	7-20-64	4.0
16	48° 09.9'	123° 12.7'	4.6	15.54	135	4-20-63	4.0
20	48° 11.6'	123° 05.8'	4.6	28.65	41	4-20-63	4.5
21	48° 10.9'	123° 02.25'	4.6	9.31	219	9-14-64	4.0
30	48° 13.9'	123° 00.1'	4.6	26.62	300	6-10-64	4.0

Appendix C (continued).

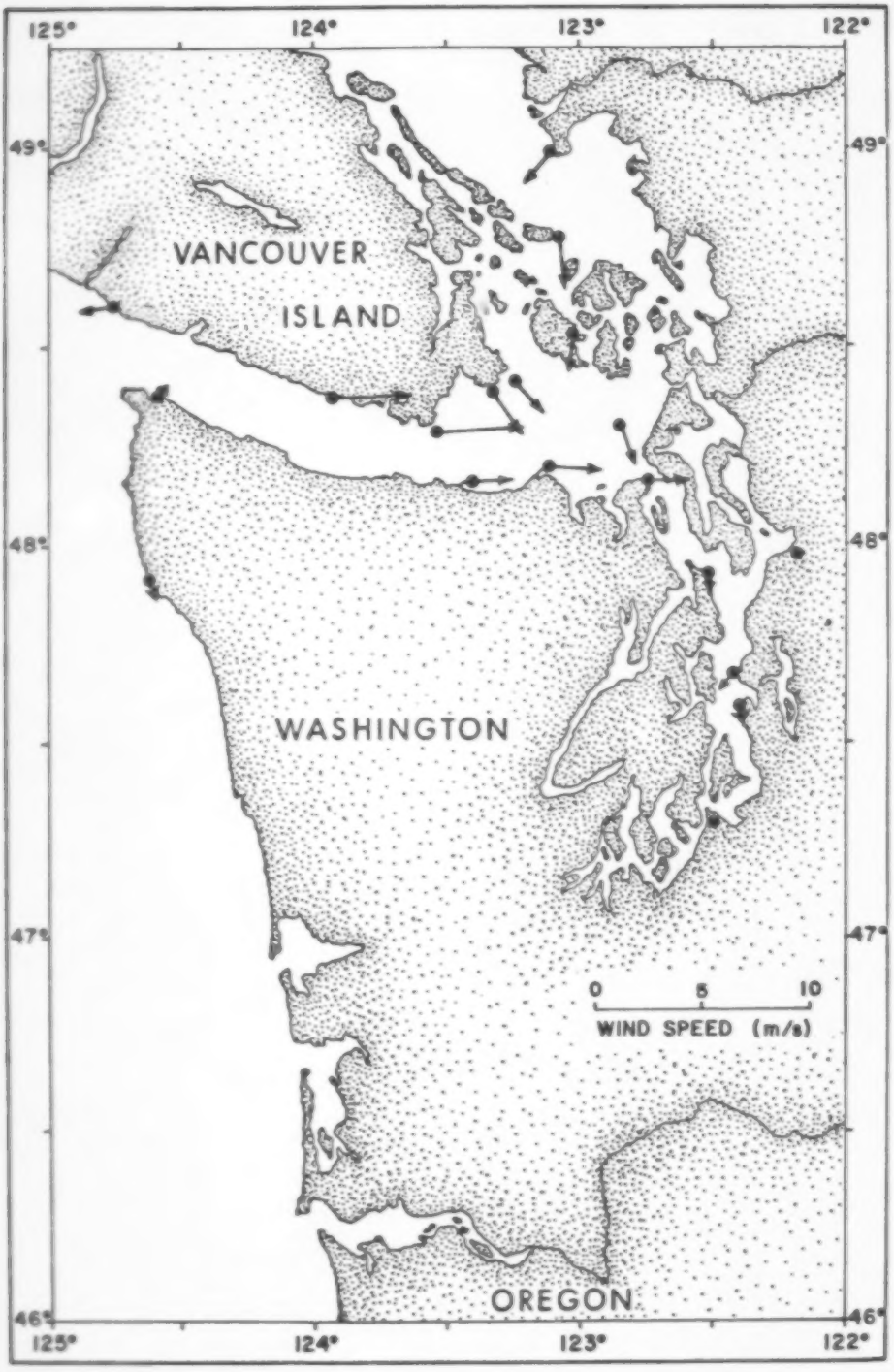
Station No.	Latitude (°N)	Longitude (°W)	Depth (m)	Net Velocity (cm/s)	Net Direction (°T)	Observation Period Begin Date	Observation Period Duration (Days)
VI. LOWER STRAIT OF JUAN DE FUCA							
D. National Ocean Survey (unpublished, b)							
825	48° 11.3'	123° 33.2'	4.6	32.13	289	7-15-66	4.0
830	48° 10.9'	123° 20.6'	4.6	30.69	290	7-23-66	4.5
845	48° 08.1'	123° 25.0'	4.6	0.90	311	7-14-66	4.1
855	48° 08.6'	123° 24.6'	4.6	19.63	320	4-20-63	4.5
860	48° 11.2'	123° 17.3'	4.6	32.24	225	7-20-66	4.0
870	48° 13.6'	123° 08.0'	4.6	20.03	261	8-10-66	4.0
875	48° 16.4'	123° 03.2'	4.6	15.87	254	6-03-66	4.0
880	48° 18.2'	123° 09.9'	4.6	17.66	295	8-10-66	4.0
885	48° 22.6'	123° 12.2'	4.6	29.66	268	8-05-66	4.5
900	48° 11.4'	122° 56.8'	4.6	16.95	265	3-20-63	4.0
905	48° 09.9'	122° 57.8'	4.6	6.11	336	3-19-63	4.5
910	48° 08.3'	122° 58.1'	4.6	9.21	261	3-19-63	4.0
E. Ebbesmeyer et al. (1979)							
1a	48° 07.3'	123° 22.3'	5.0	6.16	175	6-07-79	32.0
F. Tollefson et al. (1971)							
1	48° 08.45'	123° 23.45'	2-4	4.33	81		
2	48° 07.45'	123° 24.00'	2-4	2.49	309		

Appendix C (continued).

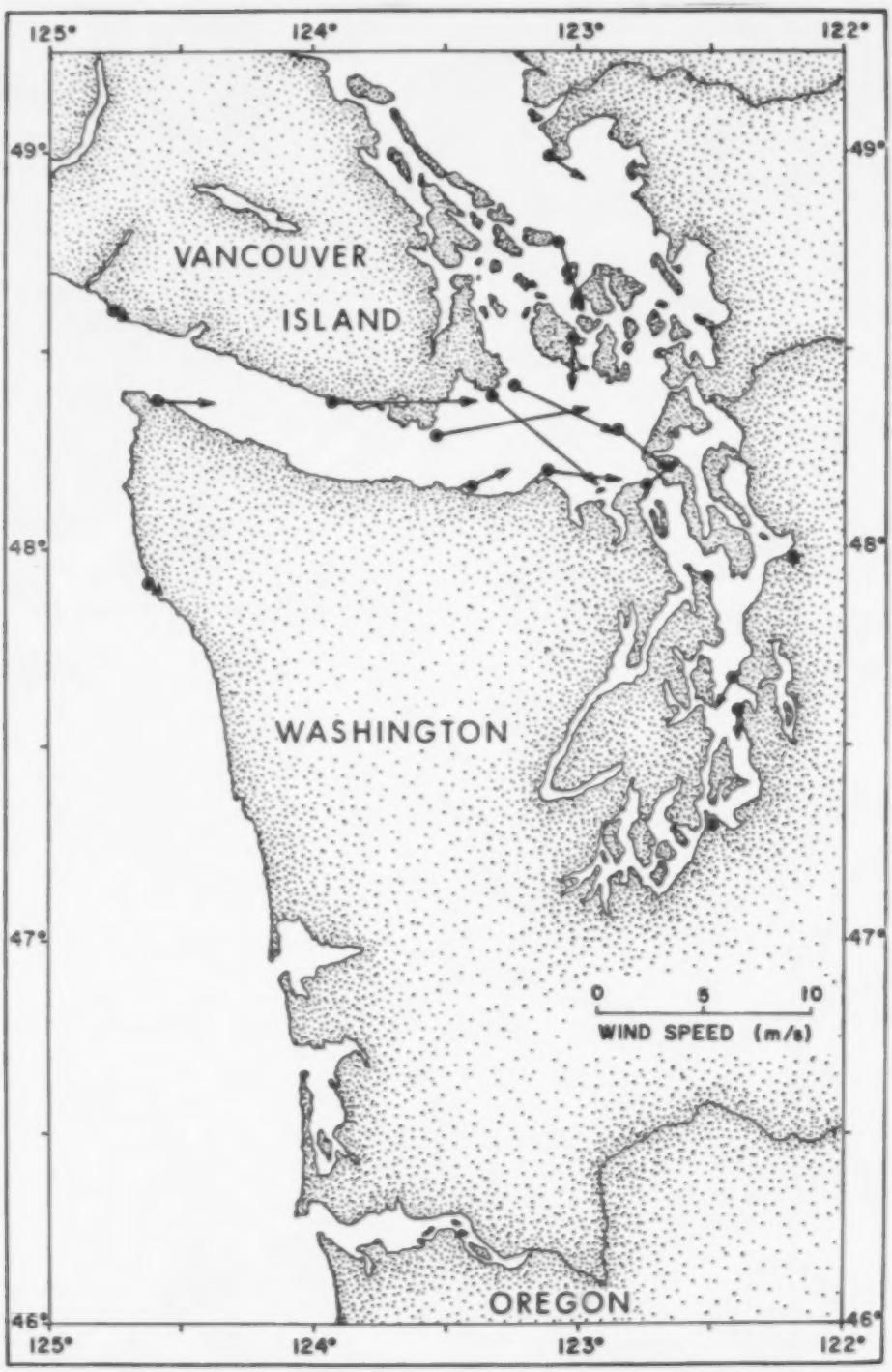
Station No.	Latitude (°N)	Longitude (°W)	Depth (m)	Net Velocity (cm/s)	Net Direction (°T)	Observation Period Begin Date	Observation Period Duration (Days)
VII. ADMIRALTY INLET							
A. National Ocean Survey (unpublished, a)							
78	48° 08.90'	122° 44.60'	4.0	23.33	322	3-19-76	8.00
C-78	48° 09.90'	122° 44.67'	4.5	9.01	19	9-01-75	20.50
C-78	48° 09.95'	122° 44.70'	4.5	17.10	328	4-13-76	8.00
C-79	48° 09.28'	122° 41.42'	4.6	29.10	246	3-16-76	8.00
C-130	48° 06.67'	122° 36.92'	4.8	23.41	17	4-01-76	20.50
C-131	48° 01.35'	122° 39.50'	4.6	39.22	20	3-30-76	16.33
C-132	48° 01.63'	122° 38.30'	4.0	24.29	352	3-23-76	33.00
C-134	48° 06.60'	122° 44.05'	4.5	5.99	194	4-01-76	16.33
C-135	48° 09.20'	122° 37.97'	5.4	30.44	308	4-01-76	20.50
C-129	48° 06.25'	122° 40.40'	5.4	26.50	23	4-01-76	12.17
B. National Ocean Survey (unpublished, b)							
945	48° 09.5'	122° 46.1'	3.7	21.35	28	3-10-65	4.0
VIII. WHIDBEY BASIN							
A. Cannon (1973)							
M	48° 05.2'	122° 21.3'	1.0	11.01	168.66	6-16-70	15.6
M	48° 05.2'	122° 21.3'	3.0	4.31	160.99	6-16-70	15.6
M	48° 05.2'	122° 21.3'	6.0	2.63	236.23	6-16-70	15.6
E	48° 05.6'	122° 20.5'	3.0	8.00	322.57	6-16-70	15.6
N	48° 07.8'	122° 23.6'	3.0	1.75	170.24	6-16-70	15.6
SA	48° 10.0'	122° 33.2'	1.0	19.67	166.04	7-07-70	20.0
SA	48° 10.0'	122° 33.2'	5.0	4.22	139.69	7-07-70	20.0
ST	48° 18.0'	122° 29.2'	5.0	7.11	175.22	7-07-70	20.0
Y	48° 24.7'	122° 36.7'	5.0	9.40	142.39	7-07-70	22.9
IX. MAIN BASIN							
A. Laird and Galt (1975)							
A603	47° 42.4'	122° 26.7'	2.5	12.17	17.94	1-15-73	30.6
V154	47° 42.4'	122° 26.7'	2.0	12.08	13.45	1-08-73	37.1

APPENDIX D

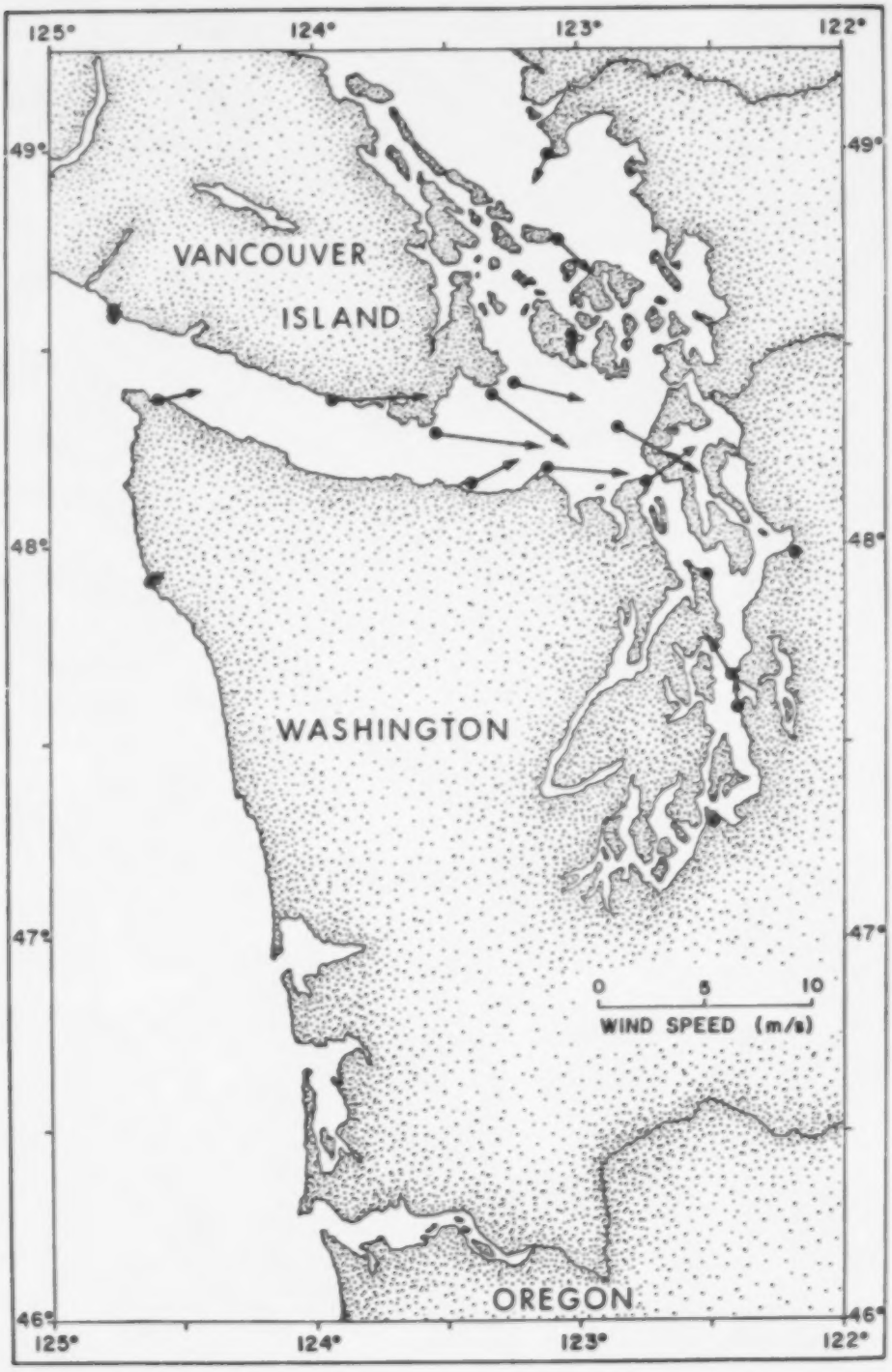
Maps of Weekly Mean Winds from 1 July-31 August 1980 at 19 Stations in Northwestern Washington and Canada. Station Names are Given in Table 4.1. Inset Shows Speed Scale of Wind Vectors.



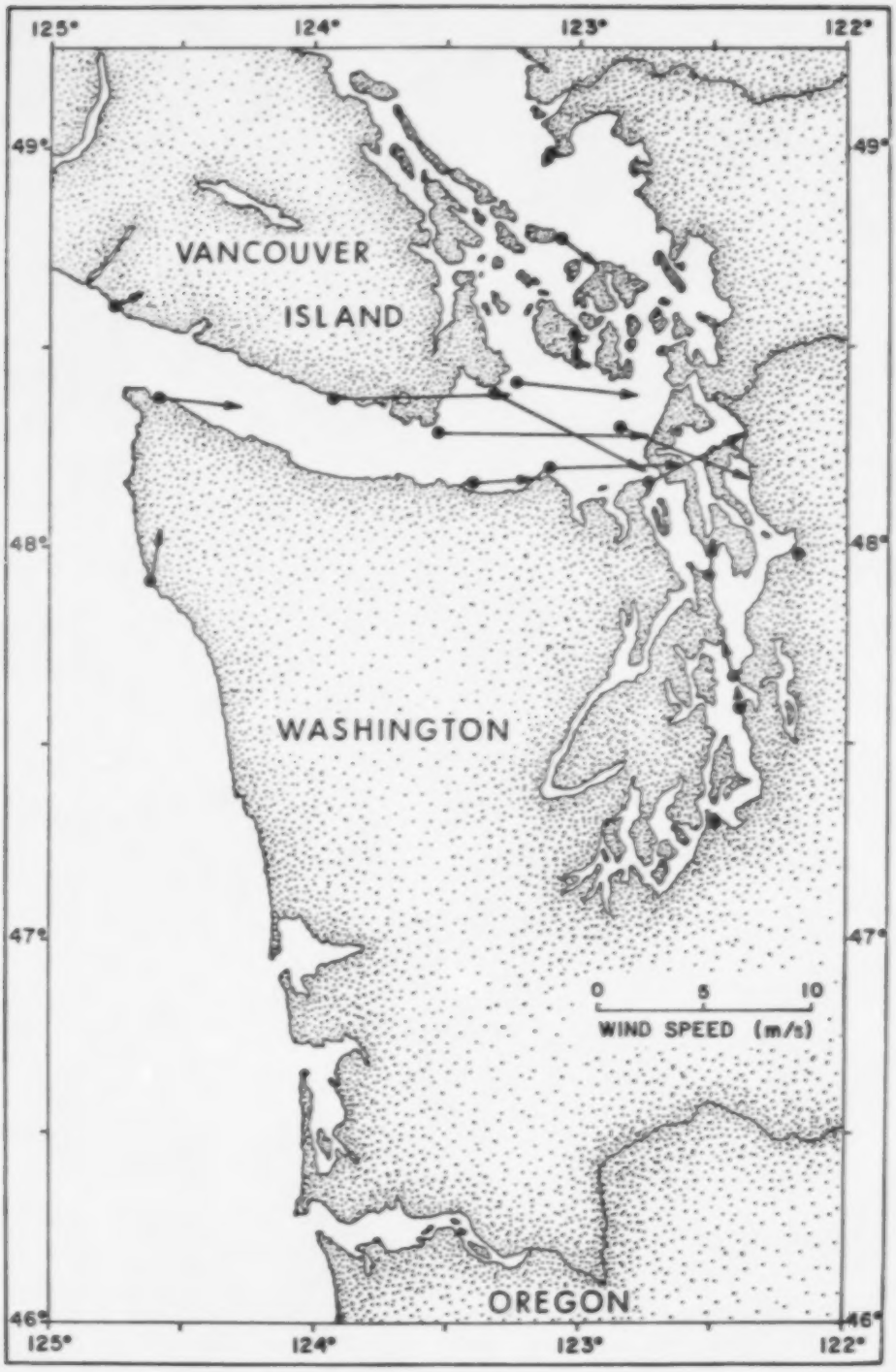
Appendix B.1. Net speed and direction of winds observed at 19 stations during 1-7 July 1980.



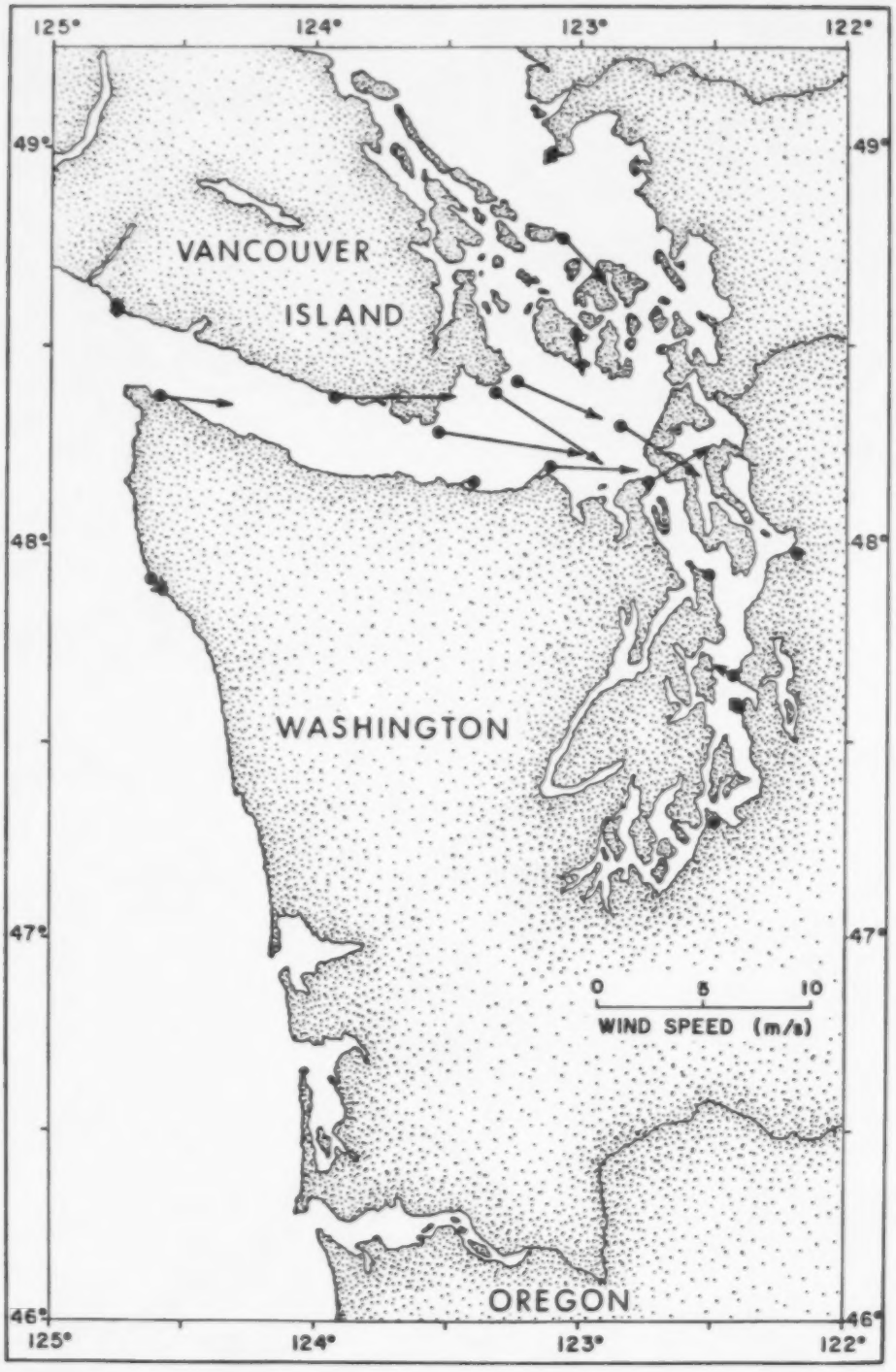
Appendix D.2. Net speed and direction of winds observed at 19 stations during 8-14 July 1980.



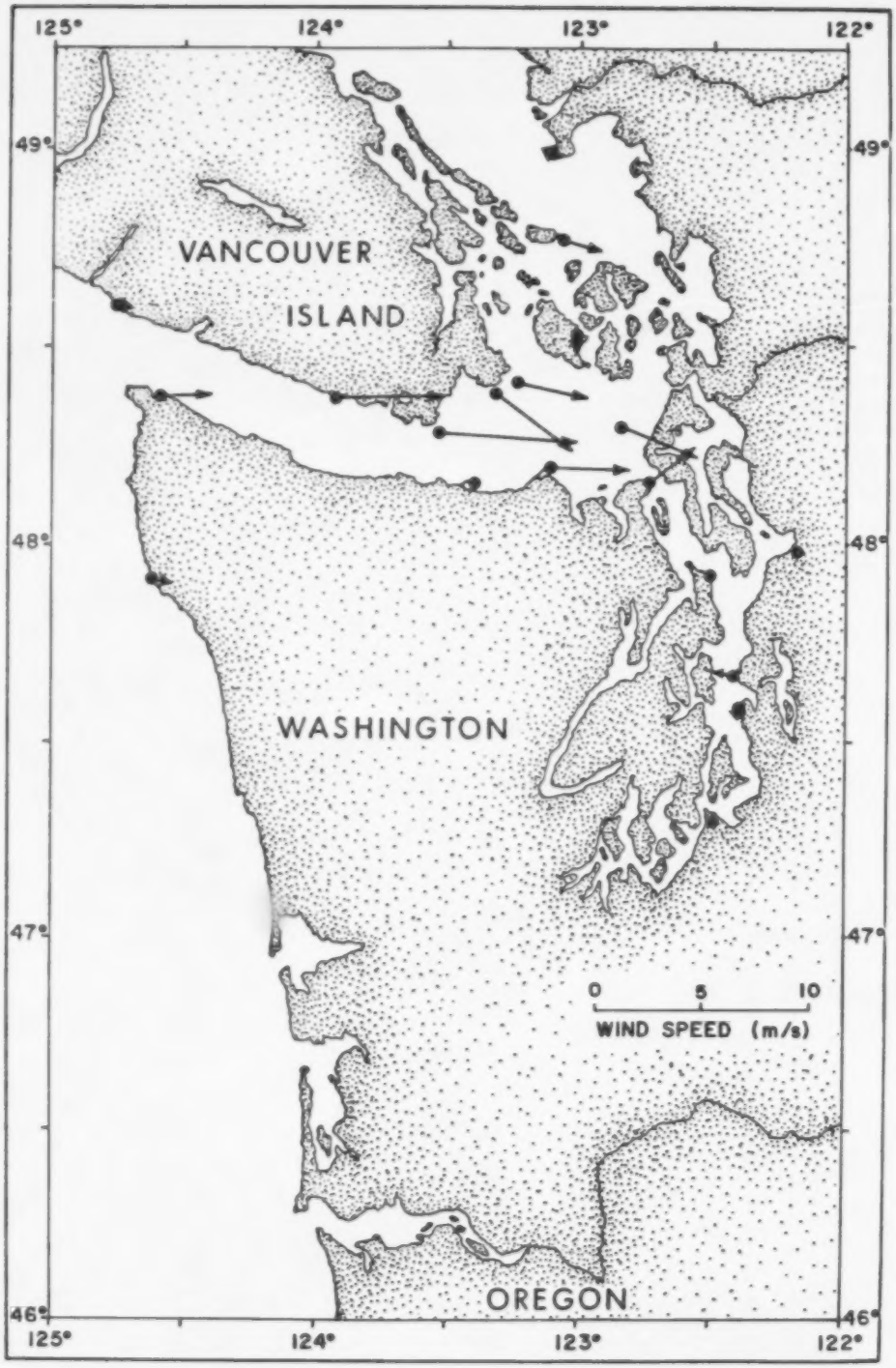
Appendix D.3. Net speed and direction of winds observed at 19 stations during 15-21 July 1980.



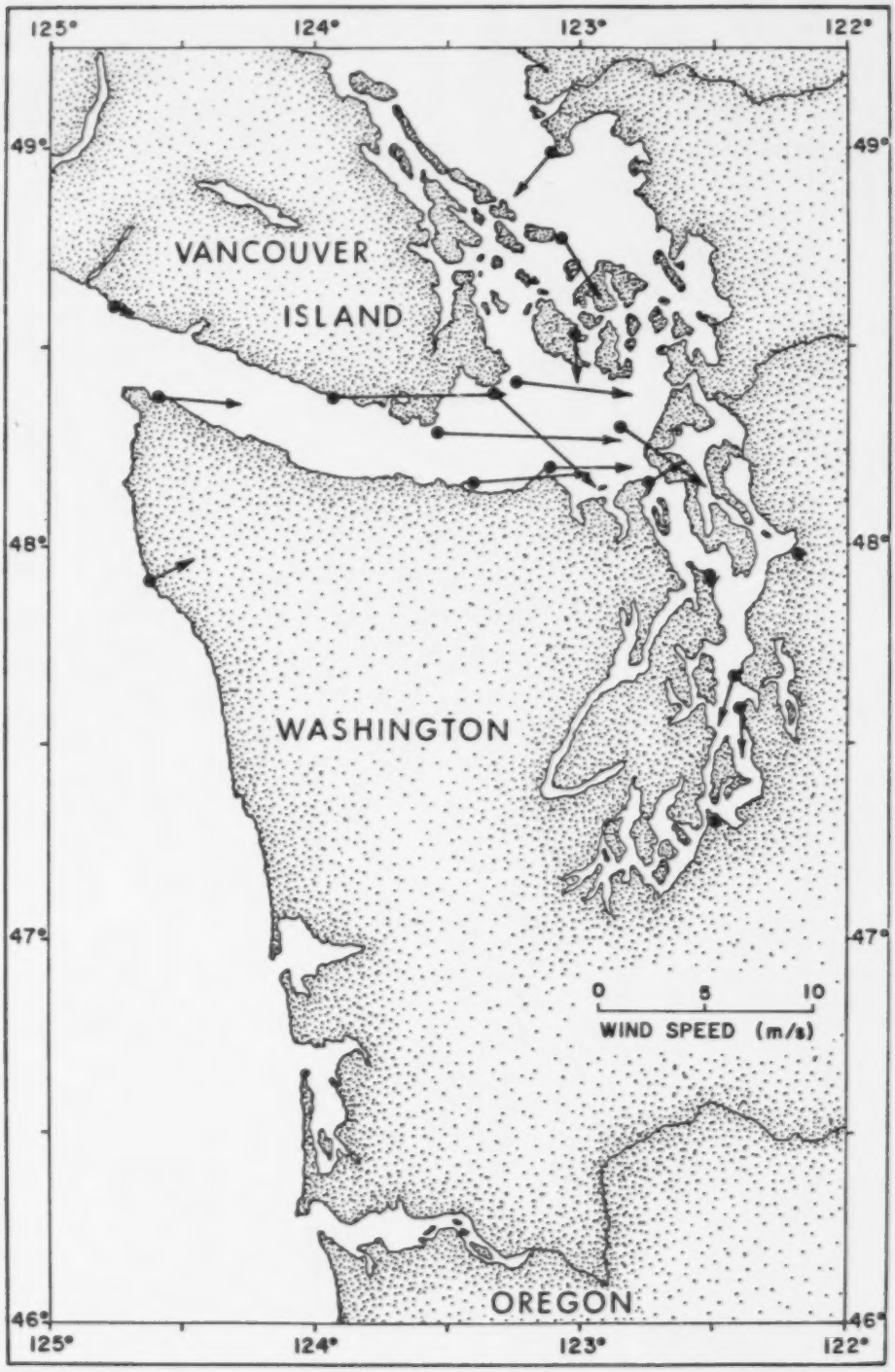
Appendix D.4. Net speed and direction of winds observed at 19 stations during 22-28 July 1980.



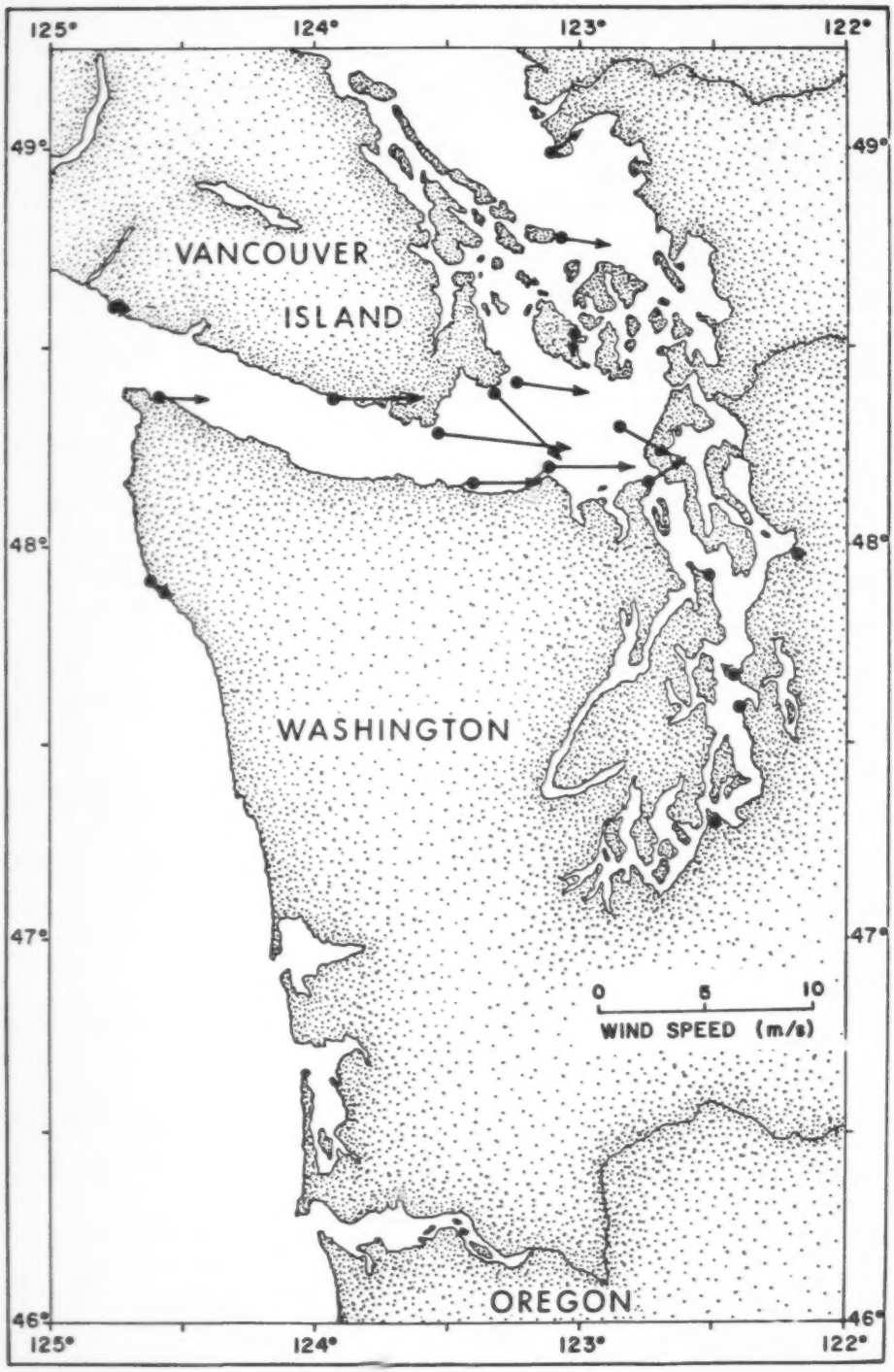
Appendix D.5. Net speed and direction of winds observed at 19 stations during 29 July-4 August 1980.



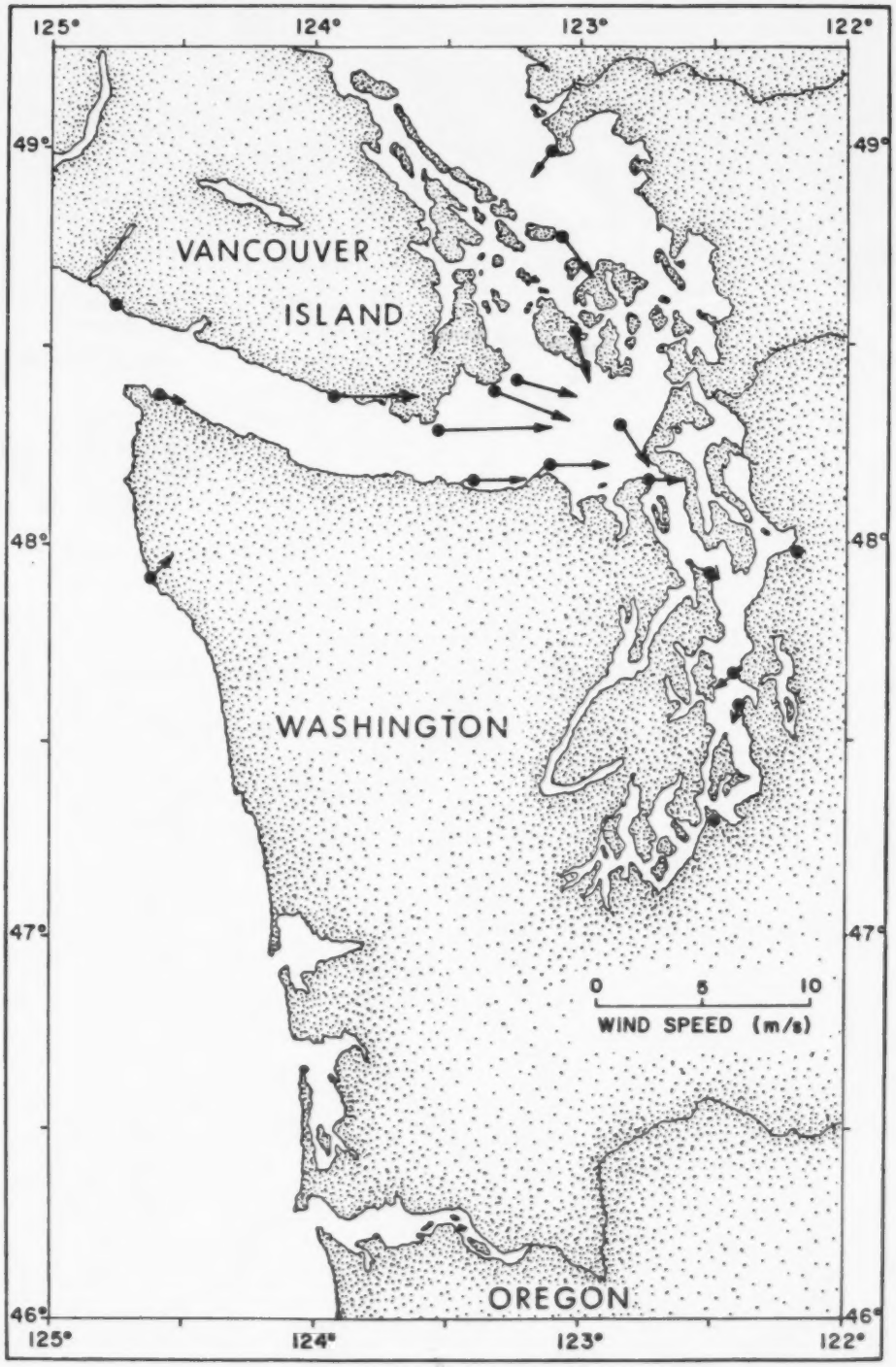
Appendix D.6. Net speed and direction of winds observed at 19 stations during 5-11 August 1980.



Appendix D.7. Net speed and direction of winds observed at 19 stations during 12-18 August 1980.



Appendix D.8. Net speed and direction of winds observed at 19 stations during 19-25 August 1980.



Appendix D.9. Net speed and direction of winds observed at 19 stations during 26-31 August 1980.

APPENDIX E

Daily Mean Winds from 1 July-31 August 1980 at 19 Stations in Northwestern Washington and Canada (see Fig. 4.3 and Table 4.1 for Station Locations). Directions are Given in Hundredths, Tenths, and Degrees True; Single Zeros Denote True North. Dates are Based on Pacific Daylight Time.

Appendix E.1. Daily mean winds from 1 July-31 August 1980 at Alki Point, Washington.

	DATE		SPEED M/SEC	DIRECTION FROM	NUMBER OF OBSERVATIONS
AP	7	1	2.12	355.08	8
AP	7	2	1.99	180.00	7
AP	7	3	2.64	190.94	8
AP	7	4	4.55	171.87	8
AP	7	5	2.62	175.02	8
AP	7	6	2.45	351.46	8
AP	7	7	2.87	0	7
AP	7	8	1.74	0	8
AP	7	9	1.21	190.84	8
AP	7	10	5.02	180.00	8
AP	7	11	5.15	180.00	8
AP	7	12	1.17	353.32	8
AP	7	13	1.76	169.59	8
AP	7	14	1.52	183.43	8
AP	7	15	1.57	186.67	8
AP	7	16	.51	0	7
AP	7	17	1.74	0	8
AP	7	18	1.68	352.80	8
AP	7	19	1.16	204.62	6
AP	7	20	2.99	358.25	8
AP	7	21	5.28	0	8
AP	7	22	1.80	180.00	8
AP	7	23	1.59	165.96	8
AP	7	24	1.37	338.53	8
AP	7	25	1.55	352.21	8
AP	7	26	2.09	352.50	8
AP	7	27	2.87	0	7
AP	7	28	2.44	339.19	8
AP	7	29	1.78	339.08	8
AP	7	30	.32	337.50	8
AP	7	31	1.74	0	8

	DATE		SPEED M/SEC	DIRECTION FROM	NUMBER OF OBSERVATIONS
AP	8	1	2.77	180.00	8
AP	8	2	1.48	194.21	8
AP	8	3	.13	270.00	8
AP	8	4	1.93	.00	8
AP	8	5	2.57	180.00	8
AP	8	6	.90	180.00	8
AP	8	7	4.34	353.98	8
AP	8	8	.84	180.00	8
AP	8	9	.84	180.00	8
AP	8	10	1.81	355.69	8
AP	8	11	4.05	180.00	8
AP	8	12	2.25	167.11	7
AP	8	13	.86	12.99	8
AP	8	14	2.19	180.00	8
AP	8	15	2.86	181.82	8
AP	8	16	.31	315.00	5
AP	8	17	7.01	180.00	8
AP	8	18	2.77	180.00	8
AP	8	19	1.33	150.95	8
AP	8	20	.85	171.25	8
AP	8	21	1.83	357.15	8
AP	8	22	.58	180.00	8
AP	8	23	1.23	173.99	8
AP	8	24	2.06	0	8
AP	8	25	.98	348.84	8
AP	8	26	2.51	202.33	8
AP	8	27	2.79	187.94	8
AP	8	28	1.22	190.44	8
AP	8	29	.90	9.93	7
AP	8	30	.84	189.35	8
AP	8	31	1.12	355.36	8

Appendix B.2. Daily mean winds from 1 July-31 August 1990 on Cockenzie Power, Canada.

Date			Speed m/sec	Direction from	Percentage of data
1	7	1	1.78	95.59	0
1	7	2	1.89	259.39	0
1	7	3	2.83	297.29	0
1	7	4	2.89	269.89	0
1	7	5	1.96	278.89	0
1	7	6	2.29	78.59	0
1	7	7	2.83	96.89	0
1	7	8	.69	152.17	0
1	7	9	2.82	92.79	0
1	7	10	2.91	270.39	0
1	7	11	1.89	93.59	0
1	7	12	.59	79.39	0
1	7	13	.78	237.49	0
1	7	14	.96	86.59	0
1	7	15	.68	142.69	0
1	7	16	2.72	82.49	0
1	7	17	.89	139.11	0
1	7	18	.81	129.59	0
1	7	19	.89	132.89	0
1	7	20	.59	111.59	0
1	7	21	4.68	227.59	0
1	7	22	.93	231.69	0
1	7	23	2.79	69.59	0
1	7	24	2.27	62.59	0
1	7	25	1.96	93.09	0
1	7	26	.91	83.49	0
1	7	27	4.12	97.69	0
1	7	28	1.93	98.49	0
1	7	29	1.92	176.59	0
1	7	30	.91	197.89	0
1	7	31	.78	79.59	0
1	8	1	.68	229.89	0
1	8	2	.97	77.89	0
1	8	3	.88	82.81	0
1	8	4	2.92	278.69	0
1	8	5	1.99	82.79	0
1	8	6	.58	71.49	0
1	8	7	.67	193.78	0
1	8	8	.89	190.89	0
1	8	9	1.93	89.17	0
1	8	10	1.98	248.89	0
1	8	11	.96	98.98	0
1	8	12	2.96	188.63	0
1	8	13	.78	229.98	0
1	8	14	2.78	261.83	0
1	8	15	1.89	98.89	0
1	8	16	.86	96.19	0
1	8	17	3.36	86.98	0
1	8	18	.18	98.89	0
1	8	19	.91	189.39	0
1	8	20	.68	98.79	0
1	8	21	.66	92.89	0
1	8	22	.79	281.98	0
1	8	23	1.73	93.79	0
1	8	24	.66	116.17	0
1	8	25	.77	98.88	0
1	8	26	1.78	248.89	0
1	8	27	2.22	89.97	0
1	8	28	.98	119.91	0
1	8	29	.82	229.88	0
1	8	30	.69	299.96	0
1	8	31	.86	81.82	0

Appendix D.3. Daily mean velocity from 1 July-31 August 1983 at Discovery Island, Canada.

Date			Speed m/sec	Direction from	Number of observations
01	0	1	3.10	90.00	6
01	0	2	0.00	127.13	0
01	0	3	0.08	225.00	0
01	0	4	.00	351.43	0
01	0	5	0.71	135.56	0
01	0	6	.07	90.32	0
01	0	7	1.59	21.80	0
01	0	8	4.06	135.32	0
01	0	9	10.06	127.00	0
01	0	10	5.13	134.01	0
01	0	11	5.04	111.31	0
01	0	12	5.04	102.43	0
01	0	13	7.01	110.01	0
01	0	14	5.69	102.43	0
01	0	15	5.08	108.12	0
01	0	16	5.91	113.02	0
01	0	17	5.93	90.00	0
01	0	18	6.67	95.42	0
01	0	19	5.93	114.74	0
01	0	20	6.00	90.27	0
01	0	21	1.79	240.71	0
01	0	22	3.96	135.77	0
01	0	23	0.00	90.00	0
01	0	24	0.01	90.00	0
01	0	25	0.00	90.00	0
01	0	26	0.00	90.10	0
01	0	27	0.00	90.19	0
01	0	28	0.13	180.91	0
01	0	29	1.17	90.17	0
01	0	30	0.09	135.06	0
01	0	31	0.17	148.45	0

Date			Speed m/sec	Direction from	Number of observations
31	0	1	4.04	140.01	0
31	0	2	7.50	90.00	0
31	0	3	3.44	103.36	0
31	0	4	0.04	90.00	0
31	0	5	3.00	135.70	0
31	0	6	4.32	106.90	0
31	0	7	2.03	90.00	0
31	0	8	4.34	90.00	0
31	0	9	5.02	103.79	0
31	0	10	.36	147.89	0
31	0	11	5.92	90.00	0
31	0	12	7.04	90.00	0
31	0	13	3.30	84.78	0
31	0	14	4.94	103.23	0
31	0	15	6.23	101.96	0
31	0	16	5.83	98.34	0
31	0	17	6.30	99.93	0
31	0	18	3.93	101.49	0
31	0	19	2.84	108.02	0
31	0	20	3.06	99.89	0
31	0	21	3.79	90.00	0
31	0	22	3.40	99.31	0
31	0	23	3.19	97.60	0
31	0	24	3.70	99.71	0
31	0	25	4.23	97.06	0
31	0	26	2.29	130.47	0
31	0	27	0.41	93.25	0
31	0	28	4.22	116.32	0
31	0	29	1.10	73.00	0
31	0	30	1.06	138.24	0
31	0	31	3.48	90.00	0

Appendix B.4. Daily mean winds from 1 July-31 August 1980 at Everett, Washington.

DATE			SPEED M/SEC	DIRECTION FROM	NUMBER OF OBSERVATIONS	DATE			SPEED M/SEC	DIRECTION FROM	NUMBER OF OBSERVATIONS
0	7	1	[illegible]	[illegible]	24	0	8	1	.62	166.76	24
0	7	2	[illegible]	[illegible]	24	0	8	2	.55	197.16	24
0	7	3	[illegible]	[illegible]	24	0	8	3	.09	261.62	24
0	7	4	[illegible]	[illegible]	24	0	8	4	.28	125.54	24
0	7	5	[illegible]	[illegible]	24	0	8	5	.43	192.73	24
0	7	6	[illegible]	[illegible]	24	0	8	6	.38	48.48	24
0	7	7	[illegible]	[illegible]	24	0	8	7	.72	126.62	24
0	7	8	[illegible]	[illegible]	24	0	8	8	.49	18.15	24
0	7	9	[illegible]	[illegible]	24	0	8	9	.51	168.77	24
0	7	10	[illegible]	[illegible]	24	0	8	10	.17	190.90	24
0	7	11	[illegible]	[illegible]	24	0	8	11	.31	314.00	24
0	7	12	[illegible]	[illegible]	24	0	8	12	.27	263.80	24
0	7	13	[illegible]	[illegible]	19	0	8	13	.20	278.15	24
0	7	14	[illegible]	[illegible]	17	0	8	14	.35	320.16	24
0	7	15	[illegible]	[illegible]	21	0	8	15	.40	142.35	24
0	7	16	[illegible]	[illegible]	17	0	8	16	.28	317.90	24
0	7	17	[illegible]	[illegible]	24	0	8	17	1.11	312.59	24
0	7	18	[illegible]	[illegible]	24	0	8	18	.29	159.76	24
0	7	19	[illegible]	[illegible]	24	0	8	19	.77	203.43	24
0	7	20	[illegible]	[illegible]	24	0	8	20	.29	270.25	23
0	7	21	[illegible]	[illegible]	24	0	8	21	.29	147.53	24
0	7	22	[illegible]	[illegible]	24	0	8	22	.16	124.76	24
0	7	23	[illegible]	[illegible]	24	0	8	23	.08	332.16	24
0	7	24	[illegible]	[illegible]	24	0	8	24	.49	55.63	24
0	7	25	[illegible]	[illegible]	24	0	8	25	.17	80.77	24
0	7	26	[illegible]	[illegible]	11	0	8	26	.48	67.66	24
0	7	27	[illegible]	[illegible]	18	0	8	27	.99	9.09	24
0	7	28	[illegible]	[illegible]	24	0	8	28	.09	273.06	24
0	7	29	[illegible]	[illegible]	24	0	8	29	.62	169.54	24
0	7	30	[illegible]	[illegible]	24	0	8	30	.21	226.37	24
0	7	31	[illegible]	[illegible]	21	0	8	31	.22	230.25	24

Appendix B.1. Daily mean winds from 1 July-31 August 1980 at East Point, Canada.

DATE			SPEED M/SEC	DIRECTION FROM	NUMBER OF OBSERVATIONS
EP	8	1	5.83	157.98	8
EP	8	2	3.71	141.33	8
EP	8	3	3.00	123.69	7
EP	8	4	3.23	[illegible]	8
EP	8	5	2.79	145.62	6
EP	8	6	1.96	158.20	8
EP	8	7	2.66	20.60	7
EP	8	8	4.03	71.57	8
EP	8	9	3.12	126.70	8
EP	8	10	1.97	66.89	8
EP	8	11	4.63	135.00	7
EP	8	12	5.66	153.22	7
EP	8	13	2.02	137.58	8
EP	8	14	4.05	159.59	8
EP	8	15	3.73	135.00	8
EP	8	16	2.88	145.30	4
EP	8	17	5.90	155.20	5
EP	8	18	1.35	117.69	7
EP	8	19	3.22	135.00	8
EP	8	20	3.03	62.28	8
EP	8	21	2.86	111.43	8
EP	8	22	2.45	105.07	8
EP	8	23	2.31	125.84	7
EP	8	24	4.50	47.32	8
EP	8	25	2.02	150.34	8
EP	8	26	4.30	142.91	8
EP	8	27	4.05	129.84	8
EP	8	28	2.44	170.61	8
EP	8	29	2.03	139.41	7
EP	8	30	1.49	142.43	8
EP	8	31	2.63	140.68	7

Appendix B.6. Daily mean winds from 1 July-31 August 1980 at Friday Harbor, Washington.

DATE			SPEED M/SEC	DIRECTION FROM	NUMBER OF OBSERVATIONS
PM	8	1	2.87	169.53	5
PM	8	2	3.68	128.85	4
PM	8	3	2.57	199.86	5
PM	8	4	1.91	160.35	4
PM	8	5	2.94	178.08	4
PM	8	6	2.57	180.00	5
PM	8	7	3.13	342.56	5
PM	8	8	.67	87.16	5
PM	8	9	1.44	180.00	5
PM	8	10	1.44	0	5
PM	8	11	3.15	185.02	5
PM	8	12	3.99	169.48	5
PM	8	13	2.05	160.81	5
PM	8	14	1.54	180.00	5
PM	8	15	2.35	177.11	5
PM	8	16	2.83	206.49	4
PM	8	17	3.64	168.10	5
PM	8	18	.66	231.34	5
PM	8	19	2.40	194.02	5
PM	8	20	1.62	198.32	5
PM	8	21	.96	153.78	6
PM	8	22	1.75	180.00	5
PM	8	23	1.34	180.00	5
PM	8	24	2.22	1.02	5
PM	8	25	2.68	180.00	5
PM	8	26	2.88	180.00	5
PM	8	27	5.55	144.59	5
PM	8	28	9.29	180.00	5
PM	8	29	1.35	166.15	5
PM	8	30	1.24	180.00	5
PM	8	31	2.66	150.35	5

Appendix B.7. Daily mean winds from 1 July-31 August 1980 at Neah Bay, Washington.

DATE			SPEED M/SEC	DIRECTION FROM	NUMBER OF OBSERVATIONS
80	8	1	9.01	71.94	6
80	8	2	6.48	89.96	9
80	8	3	6.86	263.90	6
80	8	4	2.22	169.91	6
80	8	5	2.59	287.99	6
80	8	6	1.76	8.00	6
80	8	7	2.79	9.20	9
80	8	8	9.83	100.91	6
80	8	9	9.83	101.29	9
80	8	10	.78	339.19	6
80	8	11	1.66	38.97	6
80	8	12	6.39	88.21	6
80	8	13	1.89	110.29	9
80	8	14	6.99	98.72	6
80	8	15	6.81	94.57	9
80	8	16	2.89	94.10	6
80	8	17	1.41	20.00	6
80	8	18	9.71	95.06	6
80	8	19	3.68	106.09	6
80	8	20	2.73	57.77	9
80	8	21	3.47	281.44	9
80	8	22	3.97	111.12	6
80	8	23	6.86	80.80	9
80	8	24	9.99	82.96	9
80	8	25	9.49	83.87	9
80	8	26	2.73	107.77	4
80	8	27	6.66	112.50	6
80	8	28	6.97	99.26	9
80	8	29	2.40	93.36	6
80	8	30	9.80	104.64	6
80	8	31	6.96	111.48	6

DATE			SPEED M/SEC	DIRECTION FROM	NUMBER OF OBSERVATIONS
80	8	1	1.45	47.00	6
80	8	2	4.03	108.29	6
80	8	3	1.70	58.97	6
80	8	4	5.35	88.59	3
80	8	5	2.57	90.00	4
80	8	6	5.76	94.58	3
80	8	7	.36	348.59	4
80	8	8	4.61	97.25	6
80	8	9	1.12	24.31	6
80	8	10	1.34	320.15	6
80	8	11	7.70	102.93	4
80	8	12	3.98	90.47	6
80	8	13	4.71	100.84	6
80	8	14	2.86	114.36	7
80	8	15	3.64	86.60	7
80	8	16	5.30	102.34	4
80	8	17	7.25	85.32	5
80	8	18	3.16	95.89	8
80	8	19	3.71	94.95	8
80	8	20	1.71	16.05	7
80	8	21	3.04	105.52	8
80	8	22	4.63	105.89	7
80	8	23	.22	28.71	7
80	8	24	1.29	57.56	7
80	8	25	4.63	101.04	6
80	8	26	2.39	103.73	8
80	8	27	3.90	91.22	6
80	8	28	.82	89.14	6
80	8	29	3.18	274.44	4
80	8	30	1.58	241.37	6
80	8	31	2.99	103.80	8

Appendix B.8. Daily mean winds from 1 July-31 August 1980 at New Dungeness, Washington.

DATE			SPEED M/SEC	DIRECTION FROM	NUMBER OF OBSERVATIONS
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	0.09	90.00	0
[illegible]	[illegible]	[illegible]	4.99	91.79	7
[illegible]	[illegible]	[illegible]	1.91	102.13	0
[illegible]	[illegible]	[illegible]	.27	131.73	0
[illegible]	[illegible]	[illegible]	1.43	127.50	0
[illegible]	[illegible]	[illegible]	2.67	99.99	0
[illegible]	[illegible]	[illegible]	2.23	90.00	0
[illegible]	[illegible]	[illegible]	0.50	91.33	0
[illegible]	[illegible]	[illegible]	3.02	90.00	0
[illegible]	[illegible]	10	1.99	113.91	0
[illegible]	[illegible]	11	.69	99.00	0
[illegible]	[illegible]	12	3.99	99.00	0
[illegible]	[illegible]	13	0.17	97.83	0
[illegible]	[illegible]	14	0.50	107.97	0
[illegible]	[illegible]	15	3.73	110.50	0
[illegible]	[illegible]	16	0.77	92.92	7
[illegible]	[illegible]	17	3.09	99.30	0
[illegible]	[illegible]	18	0.03	92.01	0
[illegible]	[illegible]	19	3.09	93.09	0
[illegible]	[illegible]	20	1.07	97.96	0
[illegible]	[illegible]	21	0.00	94.17	7
[illegible]	[illegible]	22	7.40	92.00	7
[illegible]	[illegible]	23	7.20	92.00	7
[illegible]	[illegible]	24	4.70	79.30	0
[illegible]	[illegible]	25	0.77	93.96	0
[illegible]	[illegible]	26	9.79	98.00	0
[illegible]	[illegible]	27	0.31	98.00	0
[illegible]	[illegible]	28	9.00	98.00	0
[illegible]	[illegible]	29	9.70	99.70	0
[illegible]	[illegible]	30	0.10	98.00	0
[illegible]	[illegible]	31	0.00	90.00	0
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	1.05	140.85	0
[illegible]	[illegible]	[illegible]	5.06	92.58	0
[illegible]	[illegible]	[illegible]	3.58	90.08	0
[illegible]	[illegible]	[illegible]	5.35	86.55	8
[illegible]	[illegible]	[illegible]	.56	96.79	8
[illegible]	[illegible]	[illegible]	5.60	90.00	0
[illegible]	[illegible]	[illegible]	4.63	90.00	8
[illegible]	[illegible]	[illegible]	3.91	92.75	8
[illegible]	[illegible]	[illegible]	4.43	89.04	8
[illegible]	[illegible]	10	2.14	99.07	8
[illegible]	[illegible]	11	6.19	96.34	0
[illegible]	[illegible]	12	4.56	90.00	7
[illegible]	[illegible]	13	4.60	87.85	8
[illegible]	[illegible]	14	4.29	100.91	8
[illegible]	[illegible]	15	3.61	96.66	8
[illegible]	[illegible]	16	5.25	90.00	5
[illegible]	[illegible]	17	4.64	72.35	8
[illegible]	[illegible]	18	1.57	97.83	8
[illegible]	[illegible]	19	4.07	94.54	0
[illegible]	[illegible]	20	2.79	83.88	8
[illegible]	[illegible]	21	4.30	85.15	8
[illegible]	[illegible]	22	5.08	90.00	0
[illegible]	[illegible]	23	3.72	92.81	0
[illegible]	[illegible]	24	3.35	90.00	4
[illegible]	[illegible]	25	4.57	90.00	8
[illegible]	[illegible]	26	1.75	101.51	8
[illegible]	[illegible]	27	0.70	83.67	8
[illegible]	[illegible]	28	1.07	116.97	8
[illegible]	[illegible]	29	1.80	79.00	7
[illegible]	[illegible]	30	.67	73.30	0
[illegible]	[illegible]	31	5.15	94.11	0

Appendix B.9. Daily mean winds from 1 July-31 August 1980 at Port Angeles, Washington.

DATE			SPEED M/SEC	DIRECTION FROM	NUMBER OF OBSERVATIONS
PA	7	1	4.07	88.83	3
PA	7	2	3.77	93.60	3
PA	7	3	2.49	78.83	3
PA	7	4	1.63	93.01	6
PA	7	5	.72	82.83	6
PA	7	6	1.19	98.84	6
PA	7	7	.97	120.48	3
PA	7	8	3.29	87.94	3
PA	7	9	4.59	81.99	3
PA	7	10	1.29	45.00	4
PA	7	11	.43	45.00	6
PA	7	12	9.19	45.00	1
PA	7	13	1.13	77.97	3
PA	7	14	1.72	90.00	3
PA	7	16	3.03	73.41	3
PA	7	17	2.49	45.00	4
PA	7	18	4.94	72.84	3
PA	7	19	3.94	90.00	3
PA	7	20	0	0	1
PA	7	21	2.57	22.50	3
PA	7	22	1.54	90.00	3
PA	7	23	9.19	90.00	1
PA	7	24	1.81	101.09	3
PA	7	25	1.54	90.00	2
PA	7	26	2.57	90.00	2
PA	7	27	0.19	45.00	1
PA	7	28	0.81	90.00	3
PA	7	29	0	0	2
PA	7	30	1.29	225.00	4

DATE			SPEED M/SEC	DIRECTION FROM	NUMBER OF OBSERVATIONS
PA	8	2	3.09	67.50	2
PA	8	9	0	0	3
PA	8	10	0	0	3
PA	8	12	7.72	90.00	2
PA	8	13	5.66	90.00	2
PA	8	18	2.57	45.00	1
PA	8	23	3.35	90.00	2
PA	8	28	2.57	90.00	1

Appendix E.10. Daily mean winds from 1 July-31 August 1980 at Point No Point, Washington.

DATE			SPEED M/SEC	DIRECTION FROM	NUMBER OF OBSERVATIONS
PM	7	1	1.14	292.34	4
PM	7	2	3.09	180.00	2
PM	7	3	7.72	180.00	1
PM	7	4	5.15	0	1
PM	7	5	0	0	1
PM	7	8	4.12	0	3
PM	7	9	0	90.00	3
PM	7	10	0	0	2
PM	7	11	0	0	2
PM	7	12	1.29	180.00	2
PM	7	13	5.41	180.00	2
PM	7	14	0	0	1
PM	7	15	0	0	1
PM	7	16	0	0	1
PM	7	17	0	0	1
PM	7	18	0	0	1
PM	7	19	0	0	1
PM	7	20	0	0	1
PM	7	22	1.72	0	3
PM	7	23	.86	0	3
PM	7	24	0	0	2
PM	7	25	.86	0	3
PM	7	26	2.57	0	1
PM	7	27	4.29	0	3
PM	7	28	9.24	20.34	2
PM	7	29	1.72	0	3
PM	7	31	0	0	1

DATE			SPEED M/SEC	DIRECTION FROM	NUMBER OF OBSERVATIONS
PM	8	1	0	0	2
PM	8	2	0	0	2
PM	8	3	0	0	2
PM	8	4	2.57	0	2
PM	8	5	1.29	0	2
PM	8	6	2.57	0	2
PM	8	7	3.86	0	2
PM	8	13	1.29	0	2
PM	8	14	0	0	1
PM	8	16	0	0	2
PM	8	17	2.57	180.00	2
PM	8	18	0	0	2
PM	8	19	0	0	3
PM	8	20	0	0	2
PM	8	21	0	0	3
PM	8	22	2.06	180.00	2
PM	8	24	2.57	0	1
PM	8	25	0	0	1
PM	8	26	2.57	180.00	2
PM	8	27	1.29	22.50	2
PM	8	28	0	0	2
PM	8	29	1.29	45.00	2
PM	8	30	0	0	1
PM	8	31	0	0	3

Appendix B.11. Daily mean winds from 1 July-31 August 1980 at Point Wilson, Washington.

DATE			SPEED M/SEC	DIRECTION FROM	NUMBER OF OBSERVATIONS
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

DATE			SPEED M/SEC	DIRECTION FROM	NUMBER OF OBSERVATIONS
PW	8	1	2.09	116.62	8
PW	8	2	3.65	65.95	8
PW	8	3	3.04	66.32	8
PW	8	4	4.62	59.37	8
PW	8	5	1.15	130.42	8
PW	8	6	3.10	57.55	8
PW	8	7	5.60	52.07	8
PW	8	8	3.37	48.35	8
PW	8	9	2.86	33.44	8
PW	8	10	2.65	34.29	8
PW	8	11	2.56	63.61	8
PW	8	12	2.39	43.49	7
PW	8	13	2.68	54.62	8
PW	8	14	3.48	72.81	8
PW	8	15	1.57	87.68	8
PW	8	16	2.70	66.21	5
PW	8	17	1.71	30.13	8
PW	8	18	.86	32.34	8
PW	8	19	2.01	75.03	8
PW	8	20	1.52	53.40	8
PW	8	21	2.75	63.23	7
PW	8	22	2.61	49.33	8
PW	8	23	2.35	68.58	8
PW	8	24	3.12	48.62	8
PW	8	25	2.69	39.65	8
PW	8	26	2.46	161.67	8
PW	8	27	3.21	64.25	8
PW	8	28	1.05	165.82	8
PW	8	29	.89	90.76	7
PW	8	30	1.09	180.00	8
PW	8	31	4.42	54.30	8

Appendix 8.12. Daily mean winds from 1 July-31 August 1980 at Quillayute River, Washington.

	DATE		SPEED M/SEC	DIRECTION FROM	NUMBER OF OBSERVATIONS
QR	7	1	0.93	25.78	5
QR	7	2	.88	169.15	5
QR	7	3	2.76	107.98	6
QR	7	4	4.90	198.61	6
QR	7	5	3.83	171.86	6
QR	7	6	2.98	7.27	6
QR	7	8	4.28	358.85	6
QR	7	9	.85	114.91	5
QR	7	10	4.10	167.44	6
QR	7	11	2.73	189.37	6
QR	7	12	1.03	10.80	6
QR	7	13	1.89	160.15	5
QR	7	14	2.46	90.04	6
QR	7	15	4.10	169.43	5
QR	7	16	.98	34.09	6
QR	7	17	.86	347.62	6
QR	7	18	0.73	0	4
QR	7	19	3.28	160.59	6
QR	7	20	2.96	17.91	5
QR	7	21	1.48	90.86	5
QR	7	22	4.37	190.62	6
QR	7	23	2.55	2.58	5
QR	7	24	0.90	7.23	5
QR	7	25	4.02	19.75	5
QR	7	26	3.27	11.22	4
QR	7	27	0.55	2.87	6
QR	7	28	4.12	350.87	5
QR	7	29	.46	45.76	6
QR	7	30	.48	131.78	6
QR	7	31	4.71	9.20	6

	DATE		SPEED M/SEC	DIRECTION FROM	NUMBER OF OBSERVATIONS
QR	8	1	3.39	169.82	6
QR	8	2	2.70	171.6?	6
QR	8	3	1.58	160.1?	6
QR	8	4	.98	137.92	3
QR	8	5	1.92	160.2?	4
QR	8	6	1.57	1??.6?	3
QR	8	7	[illegible]	[illegible]	6
QR	8	8	2.96	179.??	6
QR	8	9	2.03	93.95	6
QR	8	10	3.14	12.27	6
QR	8	11	3.98	160.82	4
QR	8	12	2.33	25.30	6
QR	8	13	3.24	63.67	5
QR	8	14	2.78	90.00	5
QR	8	15	3.12	81.22	5
QR	8	16	1.03	90.00	1
QR	8	18	1.63	333.43	2
QR	8	19	2.56	169.02	5
QR	8	20	4.12	90.00	2
QR	8	21	3.09	180.00	1
QR	8	23	.52	49.56	2
QR	8	24	2.06	45.00	1
QR	8	25	1.91	16.59	2
QR	8	29	1.72	45.00	3
QR	8	31	1.52	40.06	3

Appendix B 13. Daily mean winds from 1 July-31 August 1980 at Race Rocks, Canada.

DATE			SPEED M/SEC	DIRECTION FROM	NUMBER OF OBSERVATIONS
80	7	1	11.87	90.00	6
80	7	2	10.44	90.00	7
80	7	3	4.63	319.00	7
80	7	4	.99	29.00	7
80	7	5	2.62	121.12	7
80	7	6	3.74	90.00	6
80	7	7	7.05	102.87	4
80	7	8	10.30	90.00	7
80	7	9	11.93	90.00	6
80	7	10	3.33	98.34	7
80	7	11	3.91	97.08	7
80	7	12	7.11	93.92	6
80	7	13	8.60	89.96	7
80	7	14	8.34	94.79	7
80	7	15	3.01	105.29	7
80	7	16	6.78	90.00	7
80	7	17	7.93	90.00	6
80	7	18	8.68	94.91	6
80	7	19	4.39	138.42	7
80	7	20	6.99	95.24	7
80	7	21	3.39	244.46	7
80	7	22	14.44	91.24	7
80	7	23	11.91	90.00	6
80	7	24	3.83	93.61	6
80	7	25	13.16	90.00	7
80	7	26	4.04	90.00	7
80	7	27	8.82	90.00	7
80	7	28	8.91	95.43	7
80	7	29	3.19	137.91	7
80	7	30	7.87	90.00	7
80	7	31	12.98	90.00	7
80	8	1	3.87	128.94	7
80	8	2	10.22	90.00	7
80	8	3	4.70	116.27	7
80	8	4	10.22	94.38	7
80	8	5	3.05	124.20	7
80	8	6	8.67	95.51	7
80	8	7	6.43	90.00	6
80	8	8	7.43	90.00	7
80	8	9	8.02	90.00	7
80	8	10	1.15	140.36	7
80	8	11	12.72	90.00	7
80	8	12	11.47	93.90	7
80	8	13	9.03	92.64	7
80	8	14	9.63	90.00	7
80	8	15	9.12	90.00	7
80	8	16	10.30	90.00	4
80	8	17	8.24	97.61	4
80	8	18	3.02	117.48	6
80	8	19	6.07	100.95	6
80	8	20	5.17	99.36	5
80	8	21	8.53	90.00	7
80	8	22	8.76	95.11	7
80	8	23	5.95	106.25	7
80	8	24	4.93	90.00	7
80	8	25	9.54	98.09	7
80	8	26	2.56	62.12	7
80	8	27	11.18	90.00	7
80	8	28	5.95	101.60	7
80	8	29	1.95	78.04	6
80	8	30	2.28	90.00	7
80	8	31	11.03	90.00	7

Appendix B.14. Daily mean winds from 1 July-31 August 1900 at Smith Island, Washington.

DATE			SPEED M/SEC	DIRECTION FROM	NUMBER OF OBSERVATIONS	DATE			SPEED M/SEC	DIRECTION FROM	NUMBER OF OBSERVATIONS
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	8	SI	8	1	5.31	169.40	8
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	7	SI	8	2	7.42	134.28	8
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	8	SI	8	3	3.94	97.21	8
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	8	SI	8	4	6.61	114.49	8
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	8	SI	8	5	2.29	136.25	8
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	8	SI	8	6	5.40	114.59	8
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	7	SI	8	7	4.64	94.26	8
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	8	SI	8	8	5.83	102.83	8
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	8	SI	8	9	2.43	127.78	8
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	8	SI	8	10	1.14	103.78	8
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	8	SI	8	11	7.51	117.39	8
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	8	SI	8	12	4.08	119.64	7
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	8	SI	8	13	4.21	99.32	8
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	8	SI	8	14	6.90	139.19	8
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	8	SI	8	15	4.98	144.39	8
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	7	SI	8	16	8.14	134.17	5
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	8	SI	8	17	6.50	120.50	8
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	8	SI	8	18	3.44	104.95	8
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	8	SI	8	19	2.62	134.00	8
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	8	SI	8	20	2.29	118.06	8
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	7	SI	8	21	2.91	111.05	8
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	7	SI	8	22	4.66	131.64	8
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	7	SI	8	23	1.71	132.16	8
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	8	SI	8	24	2.91	83.72	8
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	8	SI	8	25	3.37	119.22	8
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	8	SI	8	26	2.20	220.64	8
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	8	SI	8	27	10.45	102.94	8
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	8	SI	8	28	.81	157.93	8
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	8	SI	8	29	1.07	90.63	7
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	8	SI	8	30	2.31	219.34	8
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	8	SI	8	31	6.67	178.04	8

Appendix B.10. Daily mean winds from 1 July-31 August 1980 at Shoringham Point, Canada.

DATE			SPEED M/SEC	DIRECTION FROM	NUMBER OF OBSERVATIONS	DATE			SPEED M/SEC	DIRECTION FROM	NUMBER OF OBSERVATIONS
[illegible]	[illegible]	[illegible]	[illegible]	90.00	6	19	8	1	4.71	90.00	7
[illegible]	[illegible]	[illegible]	[illegible]	90.00	7	19	8	2	6.77	90.00	7
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	7	19	8	3	3.75	90.00	7
[illegible]	[illegible]	[illegible]	[illegible]	90.00	6	19	8	4	8.16	90.00	7
[illegible]	[illegible]	[illegible]	[illegible]	90.00	7	19	8	5	3.68	90.00	7
[illegible]	[illegible]	[illegible]	[illegible]	90.00	6	19	8	6	8.53	90.00	7
[illegible]	[illegible]	[illegible]	[illegible]	90.00	6	19	8	7	3.43	90.00	6
[illegible]	[illegible]	[illegible]	[illegible]	90.00	7	19	8	8	4.89	90.00	7
[illegible]	[illegible]	[illegible]	[illegible]	90.00	6	19	8	9	5.07	90.00	7
[illegible]	[illegible]	[illegible]	[illegible]	90.00	7	19	8	10	1.22	319.87	7
[illegible]	[illegible]	[illegible]	[illegible]	90.00	7	19	8	11	11.69	90.00	7
[illegible]	[illegible]	[illegible]	[illegible]	90.00	6	19	8	12	10.37	90.00	7
[illegible]	[illegible]	[illegible]	[illegible]	90.00	7	19	8	13	8.97	90.00	7
[illegible]	[illegible]	[illegible]	[illegible]	90.00	7	19	8	14	8.81	85.94	7
[illegible]	[illegible]	[illegible]	[illegible]	90.00	7	19	8	15	9.34	90.00	7
[illegible]	[illegible]	[illegible]	[illegible]	90.00	7	19	8	16	9.27	90.00	6
[illegible]	[illegible]	[illegible]	[illegible]	90.00	7	19	8	17	9.19	84.32	6
[illegible]	[illegible]	[illegible]	[illegible]	90.00	6	19	8	18	3.09	90.00	6
[illegible]	[illegible]	[illegible]	[illegible]	90.00	7	19	8	19	5.15	90.00	6
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	7	19	8	20	3.40	90.00	5
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	7	19	8	21	4.63	90.00	7
[illegible]	[illegible]	[illegible]	[illegible]	90.00	7	19	8	22	6.18	90.00	7
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	6	19	8	23	4.58	90.00	7
[illegible]	[illegible]	[illegible]	[illegible]	90.00	6	19	8	24	2.13	90.00	7
[illegible]	[illegible]	[illegible]	[illegible]	90.00	7	19	8	25	4.76	90.00	7
[illegible]	[illegible]	[illegible]	[illegible]	90.00	7	19	8	26	2.69	84.46	7
[illegible]	[illegible]	[illegible]	[illegible]	90.00	7	19	8	27	7.80	90.00	7
[illegible]	[illegible]	[illegible]	[illegible]	90.00	7	19	8	28	4.71	90.00	7
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	7	19	8	29	.09	270.00	6
[illegible]	[illegible]	[illegible]	[illegible]	90.00	7	19	8	30	1.12	82.01	7
[illegible]	[illegible]	[illegible]	[illegible]	90.00	7	19	8	31	7.57	90.00	7

Appendix E.16. Daily mean winds from 1 July-31 August 1980 at Tsawassen, Canada.

DATE			SPEED M/SEC	DIRECTION FROM	NUMBER OF OBSERVATIONS
T	7	1	1.68	214.38	5
T	7	2	4.76	223.10	5
T	7	3	5.24	214.99	4
T	7	4	1.85	225.00	5
T	7	5	2.58	220.43	5
T	7	6	1.72	45.00	3
T	7	7	1.03	45.00	3
T	7	8	2.09	217.50	4
T	7	9	3.24	206.68	5
T	7	10	3.91	225.00	5
T	7	11	.59	238.16	5
T	7	12	1.02	220.56	5
T	7	13	2.57	225.00	5
T	7	14	2.88	225.00	5
T	7	15	7.15	219.15	5
T	7	16	1.16	225.00	4
T	7	17	1.09	116.57	3
T	7	18	1.30	196.32	4
T	7	19	4.71	220.80	4
T	7	20	.63	125.26	4
T	7	21	4.27	54.83	4
T	7	22	5.83	225.00	3
T	7	23	2.42	213.44	3
T	7	24	.89	56.93	3
T	7	25	2.45	225.00	4
T	7	26	.64	171.87	4
T	7	27	.77	67.50	4
T	7	28	4.46	45.00	3
T	7	29	3.60	50.80	4
T	7	30	.97	280.80	4
T	7	31	2.30	213.60	4

DATE			SPEED M/SEC	DIRECTION FROM	NUMBER OF OBSERVATIONS
T	8	1	4.80	225.00	3
T	8	2	1.92	198.43	3
T	8	3	1.94	65.30	4
T	8	4	1.12	229.34	4
T	8	5	.81	153.43	4
T	8	6	1.93	225.00	4
T	8	7	2.25	345.96	4
T	8	8	3.60	315.00	4
T	8	9	.27	131.73	4
T	8	10	1.03	45.00	4
T	8	11	2.41	232.40	4
T	8	12	3.45	232.27	5
T	8	13	1.66	211.61	3
T	8	14	2.20	234.54	4
T	8	15	2.83	225.00	4
T	8	16	3.09	225.00	2
T	8	17	5.09	187.87	3
T	8	18	2.71	232.73	4
T	8	19	1.52	50.36	3
T	8	20	4.29	51.50	3
T	8	21	1.63	43.76	5
T	8	22	.46	97.48	4
T	8	23	.53	120.96	4
T	8	24	8.07	45.00	3
T	8	25	1.21	203.56	3
T	8	26	3.97	231.65	6
T	8	27	1.24	130.24	5
T	8	28	2.70	225.00	4
T	8	29	1.85	225.00	5
T	8	30	.84	125.26	3
T	8	31	.49	194.47	4

Appendix E.17. Daily mean winds from 1 July-31 August 1980 at Tacoma, Washington.

	DATE		SPEED M/SEC	DIRECTION FROM	NUMBER OF OBSERVATIONS
TA	7	1	1.75	140.77	24
TA	7	2	.42	57.02	24
TA	7	3	1.74	308.67	24
TA	7	4	.46	10.52	24
TA	7	5	.80	94.17	24
TA	7	6	.85	307.56	24
TA	7	7	.43	185.37	24
TA	7	8	.40	242.37	24
TA	7	9	.85	5.01	24
TA	7	10	.25	269.31	24
TA	7	11	.49	332.52	24
TA	7	12	.29	34.43	24
TA	7	13	.35	84.74	14
TA	7	14	.54	260.43	17
TA	7	15	.46	102.09	22
TA	7	16	.61	358.54	17
TA	7	17	.70	355.29	24
TA	7	18	.47	68.27	24
TA	7	19	.41	205.11	24
TA	7	20	.47	199.75	24
TA	7	21	.33	4.16	24
TA	7	22	.77	120.93	24
TA	7	23	.41	155.95	24
TA	7	24	.40	183.75	24
TA	7	25	.30	177.22	24
TA	7	26	1.23	231.27	11
TA	7	28	1.00	282.67	16
TA	7	29	.08	271.02	24
TA	7	30	.21	167.77	24
TA	7	31	1.25	254.23	21

	DATE		SPEED M/SEC	DIRECTION FROM	NUMBER OF OBSERVATIONS
TA	8	1	.15	106.95	24
TA	8	2	.34	291.59	24
TA	8	3	.66	110.48	24
TA	8	4	.54	153.97	24
TA	8	5	.49	331.69	24
TA	8	6	.48	169.32	24
TA	8	7	1.14	310.38	24
TA	8	8	.30	243.95	24
TA	8	9	.56	242.50	24
TA	8	10	.64	53.69	24
TA	8	11	1.21	118.90	24
TA	8	12	.61	164.58	24
TA	8	13	.42	113.83	24
TA	8	14	.56	276.80	24
TA	8	15	.12	11.00	24
TA	8	16	.43	236.11	24
TA	8	17	.38	269.16	24
TA	8	18	.37	176.06	24
TA	8	19	.49	153.35	24
TA	8	20	.60	72.98	23
TA	8	21	.55	184.34	24
TA	8	22	.42	242.88	24
TA	8	23	.28	194.96	24
TA	8	24	.56	323.40	24
TA	8	25	.76	302.26	24
TA	8	26	.36	102.31	24
TA	8	27	.46	212.19	24
TA	8	28	.33	157.87	24
TA	8	29	.65	38.51	24
TA	8	30	.29	298.43	24
TA	8	31	.41	43.32	24

Appendix E.18. Daily mean winds from 1 July-31 August 1980 at Trial Island, Canada.

	DATE		SPEED M/SEC	DIRECTION FROM	NUMBER OF OBSERVATIONS
TI	7	1	5.03	138.46	6
TI	7	2	8.17	143.58	7
TI	7	3	3.52	287.94	5
TI	7	4	.50	327.12	7
TI	7	5	4.46	139.22	7
TI	7	6	1.29	135.00	6
TI	7	7	.32	77.74	4
TI	7	8	8.15	130.61	7
TI	7	9	11.70	142.87	5
TI	7	10	4.30	139.95	7
TI	7	11	2.98	132.00	7
TI	7	12	5.71	141.91	6
TI	7	13	8.66	137.75	7
TI	7	14	9.92	97.53	7
TI	7	15	6.14	140.01	7
TI	7	16	7.75	110.84	7
TI	7	17	5.09	132.66	7
TI	7	18	9.45	115.49	6
TI	7	19	6.54	144.65	5
TI	7	20	2.19	143.53	7
TI	7	21	2.96	329.33	7
TI	7	22	9.52	110.47	7
TI	7	23	9.88	121.87	6
TI	7	24	7.68	120.36	6
TI	7	25	9.98	106.03	7
TI	7	26	6.99	119.90	7
TI	7	27	7.64	132.43	6
TI	7	28	6.34	112.43	7
TI	7	29	2.28	133.15	7
TI	7	30	4.63	129.84	7
TI	7	31	8.78	125.46	7

	DATE		SPEED M/SEC	DIRECTION FROM	NUMBER OF OBSERVATIONS
TI	8	1	6.66	155.06	7
TI	8	2	10.74	113.70	7
TI	8	3	4.30	117.41	7
TI	8	4	9.09	103.23	7
TI	8	5	3.62	140.83	7
TI	8	6	6.62	135.00	7
TI	8	7	3.83	106.59	6
TI	8	8	5.79	128.30	7
TI	8	9	4.59	131.10	7
TI	8	10	.67	67.33	7
TI	8	11	8.03	121.91	6
TI	8	12	7.97	133.88	7
TI	8	13	4.32	132.58	7
TI	8	14	7.38	129.34	7
TI	8	15	9.06	135.00	5
TI	8	16	8.42	115.63	3
TI	8	17	7.28	135.00	3
TI	8	18	4.08	143.54	6
TI	8	19	3.41	140.11	6
TI	8	20	4.33	135.00	5
TI	8	21	5.15	135.00	7
TI	8	22	7.08	130.79	7
TI	8	23	4.18	137.85	7
TI	8	24	2.18	146.69	7
TI	8	25	5.95	133.50	7
TI	8	26	2.23	152.81	7
TI	8	27	11.19	98.82	7
TI	8	28	5.17	129.80	7
TI	8	29	1.20	143.69	6
TI	8	30	.56	304.20	7
TI	8	31	6.97	99.44	7

Appendix E.19. Daily mean winds from 1 July-31 August 1980 at West Point, Washington.

	DATE		SPEED M/SEC	DIRECTION FROM	NUMBER OF OBSERVATIONS
WP	7	1	5.00	340.21	5
WP	7	2	3.64	172.54	5
WP	7	3	5.56	192.98	6
WP	7	4	5.58	182.77	6
WP	7	5	3.96	170.45	6
WP	7	6	4.98	343.93	6
WP	7	7	5.08	342.39	5
WP	7	8	3.81	342.94	6
WP	7	9	1.72	220.37	6
WP	7	10	7.50	188.56	6
WP	7	11	5.37	191.65	5
WP	7	12	3.24	345.31	6
WP	7	13	2.28	193.76	6
WP	7	14	2.55	193.15	6
WP	7	15	3.91	203.13	5
WP	7	16	1.93	346.08	5
WP	7	17	2.50	338.82	6
WP	7	18	3.35	337.50	4
WP	7	19	2.38	214.01	4
WP	7	20	4.83	349.28	5
WP	7	21	7.31	337.50	5
WP	7	22	2.96	200.24	5
WP	7	23	1.79	202.01	5
WP	7	24	1.67	352.43	6
WP	7	25	3.45	347.92	6
WP	7	26	4.12	0	4
WP	7	27	4.63	348.13	6
WP	7	28	5.29	351.86	5
WP	7	29	2.41	335.83	5
WP	7	30	1.13	313.44	6
WP	7	31	3.95	351.40	5

	DATE		SPEED M/SEC	DIRECTION FROM	NUMBER OF OBSERVATIONS
WP	8	1	4.36	188.56	6
WP	8	2	1.20	315.16	6
WP	8	3	.78	243.56	6
WP	8	4	1.32	296.23	6
WP	8	5	1.99	184.53	5
WP	8	6	1.03	317.59	5
WP	8	7	7.17	350.84	5
WP	8	8	1.70	205.82	6
WP	8	9	2.19	175.62	4
WP	8	10	4.80	337.50	6
WP	8	11	6.92	201.19	5
WP	8	12	3.46	194.35	6
WP	8	13	2.20	347.07	6
WP	8	14	2.14	202.50	6
WP	8	15	3.43	188.09	6
WP	8	16	.90	264.14	4
WP	8	17	7.24	192.58	6
WP	8	18	3.63	192.59	6
WP	8	19	2.45	195.56	6
WP	8	20	1.75	180.00	5
WP	8	21	3.35	358.88	6
WP	8	22	.43	247.38	6
WP	8	23	2.14	194.19	6
WP	8	24	3.00	343.16	6
WP	8	25	3.47	342.93	6
WP	8	26	7.57	191.76	6
WP	8	27	1.69	244.92	6
WP	8	28	1.10	300.33	6
WP	8	29	2.28	330.88	6
WP	8	30	1.79	177.90	6
WP	8	31	3.57	356.84	6